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## Original Communications.

### *THE TREATMENT OF TYPHOID FEVER WITH BENZOYL-ACETYL-PEROXIDE, OR ACETOZONE—A CLINICAL STUDY OF ITS ACTION IN ONE HUNDRED AND TWENTY-EIGHT CASES IN THE COOK COUNTY HOSPITAL.*

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[From the Laboratories of the Cook County Hospital.]

The communication to the Society of American Bacteriologists by Dr. F. G. Novy last January relative to his chemical and bacteriological investigations into the structure and behavior of the new substance which he described as benzoyl-acetyl-peroxide (acetozone) seemed to announce the discovery of a substance of great value to medicine. Among other things it was stated that this substance, while in itself biologically inert, under certain conditions underwent changes which produced a germicidal activity far greater than that of any substance known heretofore.

Experiments instituted for the purpose of sterilizing the intestinal canal in human beings indicated that acetozone might prove valuable in treating various enteric conditions, as typhoid fever, etc.

For the purpose of forming a just estimate of the value of acetozone in typhoid fever, I have made a clinical test of it in 128 cases of this disease in the Cook

County Hospital, taking advantage of the recent epidemic of typhoid, during which approximately 600 cases of typhoid fever were admitted to the wards of the hospital between July 1 and November 1, 1902.

The cases were not selected, but taken at random as they were sent to the wards from the receiving office. After the first few cases were put on acetozone it was deemed better for the purpose to limit the experiment to a definite sphere, and thereafter only cases in wards 6, 10, and 13 were given the acetozone treatment.

The cases first admitted to the hospital seemed to show that the epidemic was of a mild form of fever, but later this was seen to be erroneous, for the disease proved rather to be a severe type with many and varied complications.

For the benefit of those who have not had the pleasure of reading the article in the March number of the *American Chemical Journal,* in which Novy and Freer describe acetozone, I will briefly describe this substance and the processes which develop its great germicidal power.

Benzoyl - acetyl - peroxide (acetozone) is a definite chemical compound ($C_6H_5$-$CO.O.O.COCH_3$), is crystalline in form, melts at 98° F., and is decomposed by contact with alkalies and organic matter of all kinds. It is marketed in the form of a powder mixed with equal proportions of an inert absorbent material for reasons set forth in the literature of its makers. In the presence of water it undergoes hydrolysis, and this change is necessary to develop its full germicidal activity.

The hydrolysis of benzoyl-acetyl-peroxide occurs in two directions, resulting in the formation of benzoperacid and acetic acid on one hand (Equation I), and acetoperacid and benzoic acid on the other (Equation II).

I.—$C_6H_5CO.O.O.COCH_3+HOH=C_6H_5CO.O.O.H.+CH_3CO.OH.$

II.—$C_6H_5CO.O.O.COCH_3+HOH=CH_3CO.O.O.H+C_6H_5CO.OH.$

Some unchanged benzoyl-acetyl-peroxide reacting upon the benzoperacid formed by reaction I results in the formation of insoluble benzoyl peroxide and acetoperacid, as shown in Equation III:

III.—$C_6H_5CO.O.O.COCH_3+C_6H_5CO.O.O.H=C_6H_5CO.O.O.COC_6H_5+CH_3CO.O.O.H.$

The aqueous solutions of acetozone, therefore, contain an insoluble precipitate of dibenzoyl peroxide, some acetic and benzoic acids, some benzoperacid, and chiefly acetoperacid.

It is seen, therefore, that the active germicidal agent is not benzoyl-acetyl-peroxide, as such, but acetyl-hydrogen-peroxide ($CH_3CO.O.O.H$), one of its hydrolytic products.

The hydrolyzed solutions of benzoyl-acetyl-peroxide exhibit remarkable germicidal effects: thus solutions containing 0.01 and even 0.005 per cent active oxygen are capable of destroying within one minute all known disease-producing bacteria, including the spores of such extremely resistant forms as the potato bacillus.

It is to be noted that while hydrogen peroxide readily and even violently gives up its available oxygen on contact with organic fluids, no such rapid disengagement is observed with benzo- and acetoperacids.

A few remarks concerning the preparation of the drug for administration may be of interest. The most satisfactory results are obtained from solutions made by adding 12 to 15 grains of the powdered acetozone (as marketed) to the quart of hot water, ranging in temperature from 120° to 130° F. Stopper, and shake the bottle vigorously for from three to five minutes; at the expiration of this time a milky solution is obtained, due to the infusorial earth mixture and to the formation of dibenzoyl peroxide. If allowed to stand for 15 or 30 minutes these insoluble and inert substances settle to the bottom. It is not necessary to filter the solution in using it internally, simple decantation being sufficient. I prepared the solutions in one-half-gallon bottles, which were given to the head nurse of each ward, who placed them in the ward refrigerator to cool.

This solution replaces water and all other liquids (except milk, which constitutes almost the entire food during the persistence of fever), and the patients were not only allowed to drink it *ad libitum,* but urged to do so.

In addition, the solution of acetozone as medicine is given in from four to six-ounce doses every four hours. This was the only medicine given to combat the fever, with occasional small doses of sodium phosphate or magnesium sulphate to move the bowels and to carry the acetozone solutions as far down the intestinal

canal as possible. In fact, the action of the antiseptic seems to be enhanced by the assistance of a gentle laxative. A large proportion of the cases in the experiment seemed to require no medicine but acetozone.

A temperature above 102° was treated by sponging with cold water; and if the temperature rose still higher and was not reduced by sponging, the cold pack was used. If the fever was not controlled by either of these measures, the full tub bath was given. Incidental and collateral symptoms were treated as is customary whenever they arose.

In order to present the results of the test clearly and briefly I will merely give summaries of the histories of cases by wards:

ACETOZONE RECORD.—WARDS 4 AND 8, COOK COUNTY HOSPITAL.

| Number. | Name. | Age. | Sex. | Pulse. | Temperature. | Respiration. | Widal present. | Spleen enlarged. | Rose spots present. | Days since onset. | Days fever after beginning acetozone. | Days from onset to normal temperature. | Days in hospital. | Complications and remarks. | Result. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Peterson..... | 25 | M. | 104 | 102 | 28 | Yes. | Yes. | Yes. | 6 | 9 | 16 | 24 | ..... | Recovery |
| 2 | Reese ..... | 18 | M. | 88 | 104.2 | 28 | Yes. | ..... | Yes. | 7 | 21 | 28 | 29 | Systolic murmur. | " |
| 3 | Sobea ..... | 18 | M. | 102 | 105 | 32 | Yes. | Yes. | Yes. | 10 | ... | ... | 14 | See Note 1. ..... | Death. |
| 4 | Blake ..... | 32 | M. | 120 | 105 | 24 | Yes. | Yes. | No. | 35 | ... | ... | 16 | See Note 2 ..... | " |
| | Averages.... | 23.25 | | | | | | | | 14.5 | 15 | 22 | 20.7 | | |

In wards 4 and 8 four patients were treated with acetozone solutions. The average age of the patients was 23¼ years; the youngest 18 years and the oldest 32 years of age.

The Widal reaction gave positive results in every case.

The spleen was enlarged in three cases, and rose spots present in three cases. The average duration of the illness from onset to the time of admittance was 14.5 days.

The average number of days after the acetozone treatment was begun until the temperature was permanently normal was 15 in two cases.

The average number of days from onset to permanently normal temperature of two patients was 22 days.

The average stay in the hospital of these patients was 20.7 days. Two patients made good recoveries, and two patients died.

*Note 1.*—The case of Blake, noted above, should not be counted for or against acetozone. The patient had been sick five weeks; was greatly tympanitic; had many involuntary movements of the bowels; and was delirious on admission. Four days after admission he was given the solution as regularly (every two to four hours) as possible under the circumstances obtaining in his case. The fever began to subside at once, ranging lower every day for eight days, when the drug was stopped. The patient died eight days later. Of course, such a case was not a fair test.

*Note 2.*—The case of Sobea is interesting for several reasons: he had been sick for ten days, and came into the ward July 17 with a temperature of 105° and delirious. Acetozone was given in solution and in milk and as an enema. The patient's condition was fairly satisfactory, although he had been delirious ever since admission until July 30, when double pneumonia developed, which carried him off during the next night. An autopsy was held on August 1, at which the following findings were noted:

Anatomical diagnosis: (1) Typhoid ulceration of the ileum. (2) Enlargement of the mesenteric glands. (3) Bilateral pleurisy with hemorrhagic exudate. (4) Bilateral bronchopneumonia. (5) Parenchymatous degeneration of the liver, kidneys, and heart muscle. (6) Acute splenic tumor. (7) The small intestines were greatly distended, injected in patches, Peyer's patches in lower ileum being markedly swollen; in the lower two feet there was beginning ulceration; the lower foot of the bowel was covered with ulcers. (8) The large intestine contained superficial ulcers, with hemorrhages beneath the peritoneum over the ulcers. (9) The spleen was flabby and weighed 540 grammes. The typhoid ulcers were not

nearly so deeply excavated as the usual typhoid ulcers of about the same age. Their development seemed to be retarded or inhibited. It was suggested that the powerful germicidal action of acetozone solution given as enema and as draught could have exercised an inhibitory action on the development of the ulcers.

The average number of days after the treatment was begun until the temperature was permanently normal was 18.95 days in 40 cases.

The average duration of the illness from inception to permanently normal temperature was 33.5 days in 39 patients.

The average stay in the hospital of 40

ACETOZONE RECORD.—WARD 6, COOK COUNTY HOSPITAL.

| Number. | Name. | Age. | Sex. | Pulse. | Temperature. | Respiration. | Widal present. | Spleen enlarged. | Rose spots present. | Days since onset. | Days fever after beginning acetozone. | Days from onset to normal temperature. | Days in hospital. | Complications and remarks. | Result. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Delaney | 24 | M. | 100 | 105 | 26 | Yes. | Yes. | No. | 15 | 13 | 28 | 56 | Relapse. Note 1. | Recovery |
| 2 | Burkholtz | 19 | M. | 128 | 103.8 | 32 | Yes. | Yes. | No. | 14 | ... | ... | 18 | See Note 2 | Death. |
| 3 | Dolan | 36 | M. | 100 | 103 | 26 | Yes. | Yes. | Yes. | 5 | ... | ... | 20 | Nephritis; uremia. Note 3. | " |
| 4 | Fanyo | 26 | M. | 98 | 102 | 24 | Yes. | Yes. | No. | 10 | 16 | 26 | 22 | | Recovery |
| 5 | Dobeck | 24 | M. | 98 | 102.8 | 32 | Yes. | Yes. | Yes. | 14 | 20 | 33 | 29 | | " |
| 6 | Marcotte | 32 | M. | 88 | 102 | 26 | Yes. | Yes. | Yes. | 21 | 9 | 30 | 17 | | " |
| 7 | Solarczyk | 25 | M. | 76 | 103.6 | 32 | Yes. | Yes. | Yes. | 14 | 12 | 26 | 26 | Bronchitis | " |
| 8 | Swanson | 28 | M. | 88 | 104 | 22 | Yes. | Yes. | Yes. | 10 | 40 | 50 | 50 | | " |
| 9 | Clark | 30 | M. | 100 | 103.2 | 28 | Yes. | Yes. | No. | 7 | 41 | 48 | 49 | Six hemor.; phlebitis. Note 4 | " |
| 10 | Overling | 22 | M. | 84 | 103 | 32 | Yes. | No. | Yes. | 21 | 12 | 33 | 34 | | " |
| 11 | Liberman | 22 | M. | 96 | 102.2 | 28 | Yes. | No. | No. | 14 | 12 | 26 | 23 | | " |
| 12 | Lawkagolis | 24 | M. | 92 | 101.8 | 24 | Yes. | Yes. | Yes. | 14 | 29 | 43 | 56 | See Note 5 | " |
| 13 | Friedman | 16 | M. | 84 | 102 | 28 | Yes. | No. | No. | 4 | 22 | 26 | 27 | | " |
| 14 | Dolan | 13 | M. | 106 | 104 | 28 | Yes. | Yes. | Yes. | 5 | 15 | 20 | 29 | | " |
| 15 | Spagne | 37 | M. | 92 | 103 | 26 | Yes. | Yes. | Yes. | 10 | 20 | 30 | 35 | Bronchitis | " |
| 16 | Mascagni | 33 | M. | 100 | 104.4 | 28 | Yes. | No. | No. | 8 | 19 | 27 | 39 | Nephritis; otitis media | " |
| 17 | Ahrt | 19 | M. | 88 | 102.6 | 28 | Yes. | Yes. | No. | 4 | 14 | 18 | 26 | | " |
| 18 | Tauscher | 22 | M. | 72 | 101.8 | 20 | Yes. | No. | No. | 11 | 26 | 37 | 35 | | " |
| 19 | Peters | 29 | M. | 84 | 102.8 | 28 | Yes. | No. | No. | 5 | ... | ... | 11 | Pneumon. Note 6 | Death. |
| 20 | Salinger | 14 | M. | 88 | 102 | 24 | No. | No. | No. | 8 | 29 | 37 | 35 | Phlebitis | Recovery |
| 21 | O'Connell | 22 | M. | 100 | 104 | 24 | Yes. | Yes. | Yes. | 14 | 25 | 39 | 45 | Abscess; hemorr. | " |
| 22 | Hoffman | 13 | M. | 76 | 100.2 | 24 | Yes. | No. | Yes. | 7 | 11 | 18 | 24 | | " |
| 23 | Loomis | 15 | M. | 100 | 103.8 | 32 | Yes. | No. | No. | 8 | 17 | 25 | 23 | | " |
| 24 | Kuklabsky | 33 | M. | 106 | 100.6 | 24 | Yes. | Yes. | No. | 11 | 13 | 24 | 24 | | " |
| 25 | Sallans | 32 | M. | 80 | 103.4 | 24 | Yes. | No. | Yes. | 18 | 25 | 43 | 29 | | " |
| 26 | Betron | 20 | M. | 96 | 104 | 28 | Yes. | Yes. | Yes. | ... | 18 | ... | 37 | Bed-sores | " |
| 27 | Skinner | 14 | M. | 90 | 103.4 | 24 | Yes. | Yes. | No. | 7 | ... | ... | 28 | Bronchitis. N'te 7 | Death. |
| 28 | Memmler | 17 | M. | 76 | 103.2 | 24 | Yes. | Yes. | Yes. | 4 | 26 | 30 | 58 | See Note 8 | Recovery |
| 29 | Drega | 25 | M. | 96 | 103 | 24 | Yes. | No. | Yes. | 14 | 25 | 39 | 29 | Pneumonia | " |
| 30 | Penty | 39 | M. | 88 | 103 | 24 | Yes. | Yes. | Yes. | 14 | 12 | 26 | 19 | | " |
| 31 | McLennan | 26 | M. | 84 | 103.2 | 32 | Yes. | Yes. | No. | 4 | 12 | 16 | 20 | | " |
| 32 | Nelson | 27 | M. | 96 | 103.2 | 20 | Yes. | No. | No. | 7 | 21 | 28 | 25 | | " |
| 33 | Johnson | 20 | M. | 108 | 104 | 24 | Yes. | Yes. | No. | 5 | 15 | 20 | 46 | See Note 8 | " |
| 34 | Dutch | 30 | M. | 88 | 104.4 | 36 | Yes. | Yes. | Yes. | 20 | 15 | 35 | 25 | Bronchitis | " |
| 35 | Desno | 26 | M. | 98 | 103 | 28 | Yes. | Yes. | Yes. | 14 | 15 | 29 | 26 | | " |
| 36 | Quinlan | 22 | M. | 88 | 103 | 24 | Yes. | Yes. | Yes. | 8 | 28 | 36 | 45 | See Note 8 | " |
| 37 | Bushart | 20 | M. | 100 | 104.4 | 32 | Yes. | Yes. | No. | 2 | 26 | 28 | 38 | Pneumon. Note 8 | " |
| 38 | Moss | 25 | M. | 100 | 102 | 28 | Yes. | Yes. | No. | 14 | 9 | 23 | 24 | | " |
| 39 | Gaber | 24 | M. | 100 | 102 | 24 | Yes. | Yes. | Yes. | 7 | 15 | 22 | 22 | | " |
| 40 | Jziapce | 29 | M. | 92 | 103.4 | 24 | Yes. | Yes. | Yes. | 21 | 29 | 50 | 40 | | " |
| 41 | Robinson | 18 | M. | 86 | 101 | 26 | Yes. | Yes. | No. | 17 | 9 | 26 | 22 | | " |
| 42 | Ferguson | 21 | M. | 92 | 103.2 | 24 | Yes. | Yes. | Yes. | 21 | 16 | 37 | 52 | Clothes 10/3. N. 8 | " |
| 43 | Kollisch | 29 | M. | 96 | 102.6 | 28 | Yes. | Yes. | Yes. | 18 | 17 | 35 | 33 | Bronchitis | " |
| 44 | Anderson | 32 | M. | 112 | 103.6 | 28 | Yes. | Yes. | Yes. | 9 | 10 | 19 | 29 | | " |
| | Averages | 24.6 | | | | | | | | 10.2 | 18.95 | 33.5 | 31.82 | | |

In ward 6 forty-four patients were treated with acetozone solutions.

The average age of the patients was 24.6 years; the youngest 13 years, and the oldest 39 years of age.

The Widal reaction gave positive results in every case.

The spleen was enlarged in 32 cases, and rose spots present in 26 cases.

The average duration of the illness from onset to the time of admittance was 10.2 days in 39 cases.

patients was 31.82 days, or four days over four weeks.

Forty patients made good recoveries and four patients died.

*Note 1.*—Delaney is a case which demonstrates very well the difficulty in conducting extensive clinical tests like the one in hand. The man came into the ward in a serious condition, temperature 105°, etc. He was put on the solution, but fought against taking it. Having overheard something about an experi-

ment, his ignorant mind conceived something dreadful about to happen to him, and he thereupon resisted with all his strength the well meant administrations of his attendants. Although his temperature reached the normal on the thirteenth day, he relapsed, the temperature reaching 102.2°. Then he began to coöperate with us, taking large quantities of the solution, and he became convalescent on the seventh day following the relapse.

*Note 2.*—Burckholtz is another illustration of the class of patients received into large charity hospitals, but whose case did not end so fortunately as the preceding one (Note 1). Burckholtz came into the ward presenting a temperature of 103.8°, with very irregular pulse of 128, and had been sick fourteen days. He was at once started on acetozone, but refused to take it more times than he could be induced to swallow the medicine. On the nineteenth he had a hemorrhage, many involuntary movements of the bowels, and was delirious. Owing to his extreme obstinacy the acetozone was stopped on July 25. He refused nourishment, and nutrient enemas were given. He became progressively worse; on the 29th his rectal temperature was 108° F., heart very irregular and weak. Normal salt solution by hypodermoclysis given to the amount of 2000 cubic centimeters. On the 31st he died.

*Note 3.*—Dolan, whose case was short, presented an array of complications which deserve more than passing mention. He entered the ward July 24, sick five days; pulse 100, temperature 103°, respirations 36; rose spots present, spleen enlarged, epistaxis present, tympanitic. July 29, Widal reaction was positive; July 30, he was delirious; July 31, he had stupor and involuntary stools; August 1, he had hemorrhage; August 8, he had symptoms of nephritis; August 10, uremia. On August 13 he died. Acetozone could only be given very irregularly in this case.

*Note 4.*—Clark's case is unusual in that the man recovered in spite of six hemorrhages, which took place on August 5, 6, 7, 8, 9, and 10. His convalescence was retarded by phlebitis of the deep tibial vein. He ultimately made a good recovery.

*Note 5.*—The case of the man Lawkagolis is quite remarkable and seems unique in the literature. He was sick fourteen days. He entered the ward July 31, with tympanites and temperature 101.8°. On August 4, he had a right otitis media; on August 8, bronchitis; on August 11, he was delirious; on August 12, many involuntary stools; on August 13, pneumonia; and on August 26 and 27, severe hemorrhages, which were not checked by any measures which were used until a solution of adrenalin chloride was given in doses of 3 decigrammes hypodermically, which acted splendidly, checking hemorrhage and strengthening the heart. His temperature became permanently normal on August 29, or one day over four weeks. His convalescence was delayed by bed-sores and phlebitis of the right femoral vein. This most unusual and interesting case deserves more extended description, but space forbids.

*Note 6.*—This case, Peters, should not be counted for or against the test, for although the man entered the ward on August 6 suffering from typhoid fever, and was receiving the acetozone treatment, he developed pneumonia and died August 11.

*Note 7.*—Skinner showed great toxemia. His temperature (rectal) reached 109° a short while before he died.

*Note 8.*—These patients received their clothes and were up and around the ward serving as orderlies from one to three weeks before their formal discharge from the hospital. Had they left the ward as promptly as most of the others, the "average stay in hospital" would show a lower figure.

In ward 10 sixteen patients were treated with acetozone solutions.

The average age of the patients was 26.69 years; the youngest 12 years, and the oldest 55 years of age.

The Widal reaction gave positive results in every case.

The spleen was enlarged in thirteen cases, and rose spots present in eleven cases.

The average duration of the illness from onset to the time of admittance was 10.25 days in fifteen cases; history incomplete in one case.

The average number of days after the treatment was begun until the temperature was permanently normal was 15.21 days in fourteen cases.

The average number of days from onset to permanently normal temperature in

ACETOZONE RECORD.—WARD 10, COOK COUNTY HOSPITAL.

| Number. | Name. | Age. | Sex. | Pulse. | Temperature. | Respiration. | Widal present. | Spleen enlarged. | Rose spots present. | Days since onset. | Days fever after beginning acetozone. | Days from onset to normal temperature. | Days in hospital. | Complications and remarks. | Result. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bitthus | 36 | M. | 64 | 103 | 24 | Yes. | No. | No. | 6 | 23 | 42 | 63 | See Note 1. | Recovery |
| 2 | Ladreau | 12 | M. | 120 | 104.2 | 48 | Yes. | Yes. | Yes. | 10 | 7 | 47 | 45 | See Note 2. | " |
| 3 | Diehl | 29 | M. | 100 | 103 | 32 | Yes. | No. | Yes. | 10 | 28 | 41 | 46 | See Note 7. | " |
| 4 | Wilkiewiz | 21 | M. | 120 | 103.2 | 32 | Yes. | Yes. | Yes. | 5 | 20 | 25 | 35 | Abscesses | " |
| 5 | Rzadkos | 40 | M. | 104 | 101 | 32 | Yes. | Yes. | Yes. | 14 | 9 | 23 | 30 | Pneumonia | " |
| 6 | Dubrowlski | 42 | M. | 60 | 99 | 24 | Yes. | Yes. | No. | 7 | 5 | 12 | 15 | | " |
| 7 | Wigeen | 16 | M. | 124 | 104.8 | 36 | Yes. | Yes. | Yes. | 28 | ... | ... | 3 | See Note 3. | Death. |
| 8 | Rowning | 23 | M. | 88 | 105 | 24 | Yes. | Yes. | Yes. | 4 | ... | ... | 4.5 | See Note 4. | " |
| 9 | Schuman | 18 | M. | 88 | 103 | 22 | Yes. | No. | No. | 10 | 9 | 19 | 20 | Enlarged liver. | Recovery |
| 10 | Peyne | 19 | M. | 96 | 102.4 | 24 | Yes. | Yes. | No. | 20 | 19 | 40 | 36 | | " |
| 11 | Bloch | 14 | M. | 88 | 101.4 | 24 | Yes. | Yes. | No. | 7 | 16 | 23 | 44 | | " |
| 12 | Politis | 18 | M. | 120 | 102 | 24 | Yes. | Yes. | Yes. | ... | 8 | ... | 20 | See Note 5. | " |
| 13 | Brown | 17 | M. | 120 | 104 | 32 | Yes. | Yes. | Yes. | 4 | 16 | 20 | 44 | See Note 6. | " |
| 14 | Schmidt | 27 | M. | 100 | 104 | 24 | Yes. | Yes. | Yes. | 10 | 18 | 28 | 29 | | " |
| 15 | Yule | 55 | M. | 100 | 102 | 24 | Yes. | Yes. | Yes. | 7 | 19 | 26 | 44 | | " |
| 16 | Bushy | 36 | M. | 96 | 104.3 | 24 | Yes. | Yes. | Yes. | 14 | 16 | 30 | 32 | | " |
| | Averages | 26.69 | | | | | | | | 10.25 | 15.21 | 29 | 32 | | |

thirteen cases was 29; one day more than four weeks.

The average stay in the hospital of these patients was 32 days.

Fourteen patients made good recoveries and two patients died.

*Note 1.*—Case 1: Bitthus entered the hospital on June 28, but was not put on acetozone until July 11. Under the regular treatment he regained normal temperature on July 6, but relapsed July 11, the temperature reaching 103.8° when the test was begun. Normal temperature became permanent August 3 (23 days).

*Note 2.*—Case 2: Ladreau has a history similar to above. He relapsed on August 7 under regular treatment, and acetozone was begun on August 8, temperature reaching 101°, returning to normal August 14 (7 days).

*Note 3.*—Case 7: Wigeen entered the hospital at 8.45 P.M. July 29, and was assigned to ward 10. He was actively delirious, had a temperature of 104.8°, pulse 124, respirations 36. He had been ill for four weeks. Was very tympanitic, spleen enlarged and palpable, few rose spots present, Widal reaction positive. He was put on regular typhoid orders, and the solution given as regularly as possible. Patient did not improve, muttering delirium continued, and he succumbed on August 2 at 1.15 A.M., just 76½ hours since he entered the hospital. This patient was beyond help from the first; neither acetozone nor any other drug could have saved him.

*Note 4.*—Case 8: Rowning entered the hospital at noon, July 31, and was assigned to ward 10. Temperature 105°, pulse 88 and dicrotic, respirations 34; diazo-reaction present, spleen enlarged, rose spots present, Widal reaction negative. Patient had been ill four days; was taken sick very suddenly, had an intense cephalalgia, backache, and pain in limbs. His bowel evacuations were very frequent, as many as twenty to twenty-five daily; he had intense nausea, and was very weak. He was put on typhoid orders, and acetozone solution was given frequently. No improvement secured, and very many involuntary evacuations took place. The temperature continued very high, and on August 5, at 3 A.M., registered 108.8° F. (rectal), when the patient died, four days and fifteen hours since entering the hospital. It is evident that drugs had no chance in this case.

*Note 5.*—Case 12: Politis is a Greek and could not speak English, and as there was no interpreter available his history could not be obtained.

*Note 6.*—Case 13: Brown reached normal temperature in fourteen days, on August 22, but relapsed August 25, temperature reaching 105°. Returned to normal permanently August 30.

*Note 7.*—This case was quite unique. Diehl, as a result of heavy drinking to relieve his bad feeling due to the typhoid infection, came into the hospital suffering from delirium tremens in addition to the enteric condition. The course of his case was also altered by catarrhal jaundice, nephritis, relapse, and confusional

ACETOZONE RECORD.—WARD 13, COOK COUNTY HOSPITAL.

| Number. | Name. | Age. | Sex. | Pulse. | Temperature. | Respiration. | Widal present. | Spleen enlarged. | Rose spots present. | Days since onset. | Days fever after beginning acetozone. | Days from onset to normal temperature. | Days in hospital. | Complications and remarks. | Result. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Abramowitz | 7 | F. | 140 | 105.6 | 30 | Yes. | Yes. | Yes. | 5 | 7 | 27 | 35 | Otitis media | Recovery |
| 2 | Vadlic | 5 | F. | 108 | 102.6 | 30 | Yes. | Yes. | No. | 7 | 14 | 21 | 19 | | " |
| 3 | Salerno | 11 | M. | 116 | 103 | 36 | Yes. | Yes. | No. | ... | 19 | ... | 37 | Bronchitis | " |
| 4 | Bear | 13 | F. | 120 | 103.6 | 48 | Yes. | Yes. | Yes. | 5 | 20 | 33 | 44 | | " |
| 5 | White | 10 | M. | 102 | 102.2 | 24 | Yes. | No. | No. | 6 | 7 | 13 | 21 | | " |
| 6 | Sapenstein | 6.5 | M. | 120 | 103.2 | 32 | Yes. | No. | No. | 28 | 8 | 36 | 16 | | " |
| 7 | Sapenstein | 8.5 | M. | 84 | 99.2 | 24 | Yes. | Yes. | No. | 16 | 3 | 19 | 16 | | " |
| 8 | Stein | 5 | F. | 132 | 105 | 36 | Yes. | Yes. | No. | 5 | 36 | 41 | 62 | See Note 2 | " |
| 9 | Pell | 11 | M. | 104 | 104 | 32 | Yes. | No. | Yes. | 5 | 20 | 36 | 34 | | " |
| 10 | Kiol | 5 | M. | 136 | 103.6 | 32 | Yes. | No. | Yes. | 5 | 13 | 18 | 21 | | " |
| 11 | Attain | 11 | F. | 120 | 104.6 | 36 | Yes. | Yes. | No. | 14 | 13 | 27 | 13 | | " |
| 12 | Cohn | 2.5 | F. | 144 | 104.6 | 60 | Yes. | Yes. | Yes. | 7 | 21 | 28 | 28 | | " |
| 13 | Nisberg | 5 | M. | 140 | 104.8 | 36 | No. | Yes. | No. | 9 | 28 | 37 | 47 | | " |
| 14 | Crompton | 7 | F. | 132 | 105.4 | 40 | Yes. | Yes. | No. | 5 | 32 | 37 | 75 | See Note 1 | " |
| 15 | Crompton | 9 | F. | 144 | 103.6 | 30 | Yes. | Yes. | Yes. | 2 | 54 | 56 | 75 | See Note 1 | " |
| 16 | Cobacker | 5 | F. | 120 | 100.4 | 32 | Yes. | No. | No. | 1 | 16 | 17 | 30 | | " |
| 17 | Wallace | 11 | M. | 116 | 102.8 | 28 | No. | Yes. | Yes. | 7 | 15 | 22 | 30 | | " |
| 18 | Scannel | 11 | M. | 108 | 103.8 | 28 | Yes. | Yes. | Yes. | 5 | 12 | 17 | 26 | | " |
| 19 | Ruskie | 9 | M. | 100 | 102.8 | 28 | Yes. | Yes. | No. | ... | 9 | ... | 24 | | " |
| 20 | Tarkowesky | 8 | M. | 120 | 102 | 36 | Yes. | Yes. | No. | 4 | 17 | 21 | 25 | | " |
| 21 | Goldstein | 7 | M. | 110 | 104 | 30 | Yes. | Yes. | No. | 5 | 17 | 22 | 28 | | " |
| 22 | Goldberg | 7 | F. | 120 | 103.2 | 30 | Yes. | Yes. | Yes. | 3 | 46 | 49 | 73 | Relapse and pericarditis | " |
| 23 | Krob | 11 | F. | 120 | 102 | 28 | Yes. | Yes. | No. | 4 | 58 | 62 | 62 | Pneumonia. N'te 1 | " |
| 24 | Saplitzky | 11 | F. | 112 | 105 | 32 | Yes. | Yes. | Yes. | 5 | 31 | 36 | 56 | Severe bed-sores. | " |
| 25 | Block | 7 | M. | 132 | 104 | 26 | Yes. | Yes. | Yes. | 7 | ... | ... | 40 | Perforat'n. Note 3 | Death. |
| 26 | Kelly | 5.5 | F. | 120 | 102 | 32 | Yes. | Yes. | Yes. | 7 | 19 | 26 | 25 | | Recovery |
| 27 | Gordon | 10 | F. | 132 | 104.6 | 24 | Yes. | No. | Yes. | 2 | 27 | 34 | 38 | | " |
| 28 | Nisberg | 11 | F. | 136 | 104.4 | 28 | Yes. | No. | Yes. | 7 | 12 | 19 | 32 | | " |
| 29 | St. Clair | 11 | M. | 100 | 102.6 | 28 | Yes. | No. | No. | 5 | 9 | 14 | 28 | Pneumonia | " |
| 30 | Young | 9 | M. | 120 | 103 | 28 | Yes. | Yes. | No. | 2 | 7 | 9 | 16 | | " |
| 31 | Sayers | 4 | M. | 132 | 101.4 | 36 | Yes. | Yes. | Yes. | ... | 7 | ... | 24 | | " |
| 32 | Lieberman | 7 | M. | 102 | 96.6 | 24 | Yes. | Yes. | Yes. | 6 | 13 | 20 | 19 | | " |
| 33 | Cohen | 7 | M. | 124 | 103.6 | 36 | Yes. | Yes. | No. | 3 | 9 | 12 | 12 | | " |
| 34 | Wolf | 11 | F. | 108 | 102.2 | 24 | Yes. | No. | Yes. | 7 | 32 | 39 | 54 | See Note 1 | " |
| 35 | Clamege | 9 | M. | 128 | 103.2 | 24 | Yes. | No. | No. | 8 | 13 | 23 | 31 | | " |
| 36 | Siger | 4 | F. | 112 | 101.8 | 28 | Yes. | Yes. | No. | 7 | 12 | 21 | 28 | | " |
| 37 | Nolan | 13 | F. | 120 | 103 | 26 | Yes. | Yes. | No. | 5 | 6 | 12 | 17 | | " |
| 38 | Gordon | 7 | F. | 120 | 102.4 | 26 | Yes. | Yes. | No. | 7 | 27 | 33 | 39 | | " |
| 39 | Wise | 8 | F. | 132 | 102.2 | 44 | Yes. | Yes. | No. | ... | 14 | 22 | 21 | | " |
| 40 | Finkelstein | 8 | F. | 132 | 100 | 36 | Yes. | No. | No. | 21 | 19 | 40 | 25 | | " |
| 41 | Nissburg | 8 | M. | 120 | 104.8 | 32 | Yes. | Yes. | No. | ... | 15 | ... | 19 | | " |
| 42 | Rinski | 7 | F. | 116 | 103 | 28 | Yes. | Yes. | Yes. | 3 | 28 | 31 | 54 | See Note 1 | " |
| 43 | Block | 9 | F. | 126 | 104.2 | 28 | Yes. | Yes. | Yes. | 4 | ... | ... | 11 | Perforation | Death. |
| 44 | Prichson | 5.5 | M. | 128 | 103.2 | 32 | Yes. | Yes. | Yes. | 5 | 8 | 13 | 13 | | Recovery |
| 45 | Bloch | 7 | M. | 104 | 102.2 | 28 | Yes. | Yes. | No. | 14 | 23 | 37 | 47 | See Note 1 | " |
| 46 | Gerber | 9 | F. | 132 | 103. | 36 | No. | Yes. | No. | 7 | 15 | 22 | 19 | | " |
| 47 | Kollisch | 4 | F. | 120 | 102.6 | 30 | Yes. | No. | Yes. | 8 | 9 | 17 | 15 | | " |
| 48 | Goldstein | 11 | M. | 118 | 104.2 | 28 | Yes. | Yes. | Yes. | 2 | 8 | 10 | 13 | | " |
| 49 | Heinman | 8 | M. | 100 | 102.4 | 28 | No. | Yes. | Yes. | 4 | 19 | 24 | 34 | | " |
| 50 | Lavitzisky | 3 | M. | 140 | 103.8 | 40 | No. | Yes. | Yes. | 5 | 12 | 17 | 15 | | " |
| 51 | Finkelstein | 9 | M. | 120 | 101.6 | 32 | Yes. | Yes. | No. | 7 | 8 | 15 | 12 | | " |
| 52 | Wold | 4 | F. | 124 | 102.2 | 28 | Yes. | Yes. | Yes. | 7 | 25 | 32 | 39 | See Note 1 | " |
| 53 | Nalofsky | 6 | M. | 126 | 102.8 | 30 | Yes. | Yes. | Yes. | 5 | 25 | 30 | 50 | See Note 1 | " |
| 54 | Rafferty | 5 | M. | 104 | 103.2 | 30 | No. | Yes. | No. | 14 | 17 | 31 | 21 | Inguinal adenitis | " |
| 55 | Tarkowesky | 8 | M. | 126 | 105 | 30 | Yes. | Yes. | Yes. | 3 | 11 | 14 | 29 | Relapse of Case 20 | " |
| 56 | Koache | 10 | F. | 100 | 101.2 | 26 | Yes. | Yes. | Yes. | 7 | 15 | 22 | 37 | | " |
| 57 | Dachina | 9 | F. | 140 | 103.4 | 26 | No. | Yes. | No. | 28 | 10 | 38 | 22 | | " |
| 58 | McAndrews | 10 | F. | 136 | 105.4 | 24 | Yes. | No. | No. | 6 | ... | ... | 6 | See Note 4 | Death. |
| 59 | Moran | 12 | F. | 100 | 102 | 24 | No. | Yes. | Yes. | 21 | 11 | 32 | 26 | | Recovery |
| 60 | Wolf | 11 | F. | 108 | 102.2 | 24 | Yes. | No. | Yes. | 7 | 22 | 29 | 43 | See Note 1 | " |
| 61 | Boland | 3.5 | M. | 120 | 101 | 28 | No. | Yes. | No. | 10 | 24 | 34 | 43 | See Note 1 | " |
| 62 | Hoffman | 4 | F. | 140 | 104.8 | 38 | No. | Yes. | No. | 7 | 14 | 21 | 15 | | " |
| 63 | Weiss | 10 | F. | 120 | 104.2 | 30 | Yes. | Yes. | Yes. | 5 | 20 | 25 | 42 | | " |
| 64 | Carvella | 6 | M. | 136 | 103 2 | 30 | No. | No. | No. | 7 | 14 | 21 | 16 | | " |
| | Averages | 8.08 | | | | | | | | 7.36 | 18.11 | 26.82 | 30.89 | | |

insanity. The patient's mentality was not cleared up until August 26, or forty-five days since his admission.

In ward 13, the children's ward, sixty-four patients were treated with the acetozone solutions.

The average age of the patients was 8.08 years; the youngest 2.5 years, and the oldest 13 years of age.

There were thirty-three girls and thirty-one boys.

The Widal reaction gave positive results in fifty-three cases.

The spleen was enlarged in forty-nine cases, and rose spots were present in thirty-one cases.

The average duration of the illness from onset to the time of admittance was 7.36 days in sixty cases; not known in four cases.

The average number of days after the treatment was begun until the tempera-

tury was permanently normal was 18.11 in sixty-one cases.

The average patient was convalescent in 26.82 days from the onset of the illness (record incomplete in seven cases).

The average stay in the hospital of these patients was 30.89 days.

Sixty-one patients made good recoveries and three patients died.

*Note 1.*—These patients were given the solution very irregularly. In this ward the regular, homeopathic, and eclectic schools of practice are all represented by patients and attendants. The solution, although given to all the patients, was not given to all alike. Certain cases were decidedly handicapped by not having it regularly administered.

*Note 2.*—This is a particularly interesting case. Sadie Stein came into the ward July 28; had been sick five days, pulse 132, temperature 105°, respirations 36. The Widal reaction was positive, and her spleen was enlarged. Solution begun at once. Temperature returned to normal August 12. On August 17 a relapse occurred, temperature reaching 104.6° and returning to normal on September 2. During her fever she developed a very severe paronychia on every finger, and also a cervical adenitis which necessitated opening and evacuation of the pus. These complications, of course, militated against her prompt recovery, which, however, took place eventually. She left the hospital September 28, just two months after admission.

*Note 3.*—Willie Block is an example of the pernicious habit of allowing friends and relatives to visit patients unaccompanied by attendants. This little boy was admitted to ward 13 on the morning of August 5 suffering from a typhoid fever of seven days' duration. Pulse 132, temperature 104°, respirations 26; Widal positive, spleen palpable, rose spots present. He was put on acetozone. His temperature returned to normal on August 24 and remained so until August 30, when a slight relapse took place, temperature ranging from 99.2° to 101° until September 11, when visitors to his bedside presented him with several oranges which they had smuggled into the ward, and which he ate entire, including the peel. The next morning at five o'clock his temperature registered 103°, pulse 136 and weak. His abdomen was rigid, tender, and painful. The leucocyte count was 10,800. On September 12, at 4 P.M., he complained of pain in abdomen, his cheeks were flushed, the heart and lungs negative, the abdomen tympanitic, the liver dulness was not impaired, but there was a small area of impaired resonance over lower portion of left rectus, and here, and over the left flank, was marked tenderness and rigidity. All diet was entirely withdrawn. Normal salt enemas were used. The patient vomited clear liquid with no odor. At 9 P.M. his pulse was 148, temperature 103°, respirations 24, and he vomited a green, slimy substance with very disagreeable odor, and complained of great thirst. He remained all night in about the same condition, and next morning was transferred to surgical side and operated upon. He returned to ward in fair condition, but failed to improve, gradually weakened, and died 4 A.M., September 15. This case is only an added instance of the frequently grave results of giving solid food to typhoid patients in spite of the warning of the medical attendants.

*Note 4.*—Alice McAndrews was admitted September 2; sick six days, temperature 105.4°, pulse 136, respirations 24. She did not react to any of the measures that were taken, temperature running very high, reaching 107.4° (rectal) on September 8 at 3. P.M., just before death.

### RECAPITULATION.

The pulse, temperature, and respiration in the tables is that shown on admittance.

The temperatures shown on admission were high: 111 cases came into the hospital with temperatures of 102° F. or higher; 78 with temperatures of 103° or higher; 37 with temperatures of 104° or higher; 10 with temperatures of 105° or higher.

The highest temperatures on admittance were 105.6° (see Case 1), 105.4° (Case 14, ward 13), both of whom recovered, and 105.4° in Case 58, ward 13, which died. The lowest temperature on admittance was 99°—Case 6, ward 10, recovered.

The highest temperatures recorded in the series, at any time, were 109° F. (rectal) in Case 26, ward 6, just before death; 108° F. (rectal) in Case 2, ward 6, two days before death; and 108.8° F. (rectal) in Case 8, ward 10, just before death.

The average duration of the fever after the administration of acetozone was begun was eighteen days in the 117 recovered cases.

The average duration of the fever from onset to a permanently normal temperature in 111 cases was 29.37 days (in the remaining cases of the series the histories of the cases before admission to the hospital are unavoidably incomplete), or one and a third days over four weeks.

The average stay in the hospital of the 128 patients was 31.04 days.

Of the whole series of 128 cases, 117 made good recoveries, or 91.4 per cent, while 11 died, or 8.59 per cent.

Statistics of the cases of typhoid fever in the hospital not treated with acetozone show a death-rate of approximately 13.1 per cent.

In strict justice to the test—that is, acting in the spirit of this experiment—which was to ascertain the value of the new drug in the treatment of typhoid fever, such cases as No. 4 in wards 4 and 8, Nos. 7 and 8 in ward 10, and Nos. 25 and 58 in ward 6, should not be counted for or against the drug. This would change the death-rate of the 123 remaining cases to 4.87 per cent, which will be conceded to be unusually low.

In two years' experience in this hospital I have seldom seen typhoid patients discharged recovered in less than six weeks, whereas under the acetozone treatment many left the hospital recovered in four weeks or less; the average sojourn for the 128 cases being slightly more than twenty-eight days.

The time-honored aphorism, "Typhoid fever must run its course of five or six weeks," did not hold good in this series of cases.

Under the acetozone treatment in favorable cases (seen early) the duration of the disease has been materially shortened, and the most disagreeable symptoms ameliorated.

The typhoid fetor of the stools and the peculiar odor of wards containing typhoid patients are greatly lessened.

The stupor and delirium were very much less, tympanites less frequent, and diarrhea was checked.

The temperature was reduced; the nurses uniformly commenting on their lightened tasks when caring for typhoid cases under the acetozone treatment.

Forty ounces of the drug was used in the test, being an average of 138.12 grains to each patient.

### CONCLUSIONS.

Many patients were given acetozone very irregularly on account of many contributory causes: dislike of the taste and odor of the solution; resistance of ignorant patients; lack of persistence on the part of overworked attendants, due to the crowded wards caused by the epidemic.

Those patients who are given the drug early, often, and regularly show the best results of this treatment.

What Virchow calls the "brutal force of figures" cannot but convince any one that acetozone lowers the temperature, shortens the duration of the fever, and lessens its toxic symptoms more than our better known treatments.

From the information gained in watching this series of one hundred and twenty-eight cases of typhoid fever, I believe that where cases can be seen during the first week of the illness and given large amounts of acetozone solution regularly and often, assisted by a gentle laxative, the temperature will return to the normal in from ten to twelve days.

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## *THE EFFECTS OF THE INHALATION OF SMOKE AND OF IRRITATING AND POISONOUS GASES BY FIREMEN, AND THE PROPER TREATMENT OF THE RESULTS.*

By J. Chalmers Da Costa, M.D.,
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For a number of years I have had a surgical connection with the Fire Department, and during that time have also been surgeon to a hospital in the heart of the city. Consequently many injured firemen have been under my care. The occupation of fireman is exceedingly dangerous, and accidents are excessively common. They may happen at the fire station, while the men are running rapidly down-stairs or dropping down the sliding-poles, while they are hitching up the horses, or while the apparatus is starting out. Collisions, run-over injuries, and hurts from being thrown off the apparatus are by no means rare during the run to

the fire through the crowded streets of a great city. Accidents on the fire-ground are very common indeed. Many of these accidents are slight; a number are severe; a few are very grave; and some are fatal.

Accidents are of all sorts and kinds, and some of them are of peculiar and even of a special nature. Besides ordinary cuts with glass, tin, etc.; burns, scalds, bruises, splinter wounds, fractures, dislocations, crushes, heat-exhaustion, kicks and bites by horses, injuries from falls and from being struck by pieces of falling masonry, etc.; and punctured wounds of the feet, nails having penetrated the gum-boots—other peculiar or even dreadful accidents may occur. I have known a fireman to be drowned in the hold of a burning vessel, into which water was being poured; and have known several to be nearly drowned in cellars filled with water. Many have been badly injured by explosions of gasoline and other dangerous substances; and a little over a year ago three were instantly killed, having been overwhelmed by a burst of blazing petroleum. Now and then, on a hot day, several cases of sunstroke will develop during a fire. A powerful stream of water will knock a man off a roof or a ladder, and if it hits a man at close range, it will of itself do great damage. It is not at all uncommon for a fireman's testicles to be seriously bruised, a district engineer had a dislocation of the lens of the eye thus produced, and many a fireman has had an ear-drum ruptured by a stream of water. One hoseman, struck at close range, fell over with a cerebral hemorrhage.

In this paper, however, I shall not consider the strange and unusual injuries that firemen may receive, but shall discuss the difficulties and dangers that follow an attempt to work in dense smoke, in irritating gases, or in poisonous vapors. While working at a fire of any size, every fireman inside the building suffers more or less from smoke. Even if not overcome, he is nauseated and often vomits, he always coughs and expectorates, he is frequently dizzy, and his eyes invariably water and smart. For a day or two afterward, if he has been in really dense smoke for any length of time, his eyes are red and irritated, his throat is sore, he coughs at intervals, and hawks up thick phlegm specked with visible pieces of carbon. As a rule the tracheitis and bronchitis soon pass away; but I have seen distinct bronchopneumonia develop, and occasionally edema of the lungs occurs.

There is a great difference among men in their tolerance to smoke, and a great difference in the same man at different times. Some never learn to "take smoke," and others stand it for a time with apparent indifference. I have repeatedly known men to stay for several minutes in an atmosphere that had put out their lamps. A heavy whiskey-drinker makes a poor fireman. He stands smoke very badly, and chokes and vomits when even slightly exposed. A fat man, a victim of heart disease, or a sufferer with laryngitis or chronic bronchitis, can scarcely endure smoke at all. Other circumstances being equal, a small man can tolerate it better than can a large man. Smoke can be withstood better when the stomach is empty than when it contains a partly digested meal. Firemen are overcome more easily on a hot than on a cold day; and on a hot day, heat-exhaustion or even sunstroke may be added to the trouble with the smoke. A man who has been running, climbing stairs or ladders, dragging hose, or shouting orders is apt to be quickly overcome.

A fireman must accustom himself to "taking smoke;" must learn invariably to breathe through his nose; must keep silent unless speech is imperatively necessary; and must try to obtain every possible particle of air by keeping his nose near the floor or close to the branch-pipe from which the water emerges. Near the floor there is always some air, and the water from the branch-pipe always brings air with it.

There is a great difference between smokes of different kinds. The smoke of all burning buildings contains some carbon monoxide, and the poisonous power of the smoke is in direct proportion to the amount of this gas present. All smoke is hard to bear, but some kinds are worse than others. Some smoke is merely irrespirable; some is not only irrespirable, but poisonous; some is also very irritating to the larynx, bronchial tubes, and eyes. Cold smoke is much less oppressive and irritating than hot smoke. Some smoke contains solid particles of actively irritating matter, or has in it some peculiarly ir-

ritating vapor. Such smoke stings the eyes fiercely and induces violent spasm of the glottis. This is met with notably when ammonia is present, or when the smoke contains spices and pepper. Smoke containing illuminating gas is extremely poisonous.

Among the worst forms of plain smoke may be mentioned the following: smoke from lumber, furniture, barrel-staves, peach-baskets, and paper. Such smoke is not only suffocating, but is extremely irritating to the eyes and to the respiratory organs. It is hard to tolerate the smoke from chemicals, heavy oils, varnish, paint, certain kinds of rags, wool, broom-straw, cotton, and spices. The smoke from other sorts of rags, hay, pitch, tar, and petroleum is not so offensive or so irritant. In a burning macaroni factory in which chrome-yellow was used, the smoke was found extremely irrespirable and fearfully irritant.

In considering the relative severity of smokes, one must take into consideration their density. If smoke has not free outlet and is packed in a building, it matters not what its source, men will be overcome. As stated above, hay does not make the worst of smokes; yet at a fire in a hay store from which the smoke had scarcely any chance of exit, more than forty firemen were overcome. In every large cellar-fire, numbers of firemen are overcome by smoke.

It is usually stated that when a lantern cannot burn in smoke a man cannot live. As a matter of fact, a lamp will burn in a percentage that is distinctly dangerous to human life; and if a man remains for any length of time in an atmosphere in which a lamp will not burn he will surely be overcome. As previously stated, however, I have repeatedly known men to stay for several minutes in an atmosphere that had put out their lights.

Smoke containing ammonia is sometimes encountered at fires in breweries and in cold-storage warehouses, and smoke containing sulphurous acid is sometimes met with at fires in wool warehouses and broom-straw establishments. Smoke that contains either of these ingredients is entirely irrespirable and fearfully irritating, and induces fierce conjunctivitis and violent spasm of the glottis.

Illuminating gas in smoke is extremely dangerous. Gas-pipes are loosened by the melting of solder, by the settling of a floor, by the falling of ceilings and of heavy objects, and by pulling down ceilings and partitions. The officials of the Fire Department always order the gas to be shut off at an early stage of a large fire; but now and then the firemen suffer from the effects of gas, especially those who first enter the building. Ordinary coal-gas creates a deadly poisonous atmosphere before it reaches the explosion point. One part of gas to eleven of air is explosive. The odor can be detected when gas is present in the proportion of .02 per cent. Water-gas cannot be detected by its odor. At the present day coal-gas contains a quantity of water-gas. Water-gas is extremely dangerous, as it contains 47 per cent of the monoxide of carbon, whereas the ordinary coal-gas contains less than 10 per cent. By the addition of water-gas to coal-gas, the odor of the latter is lessened and its poisonous properties intensified. When a building is filled with smoke the odor of the gas may not be detected; but even then an experienced fireman will know that he is in an atmosphere of illuminating gas by tasting it.

Smoke containing acid fumes is sometimes encountered at fires in bleaching establishments, tanneries, chemical houses, etc., and it produces cough, conjunctivitis, and intolerable dyspnea from laryngeal spasm. Very recently, Chief Foley of Milwaukee and three of his men died from the inhalation of the fumes of nitric acid, a large carboy of this chemical having been broken. The grave symptoms did not develop for an hour or more, when pulmonary edema and edema of the glottis apparently ensued.

Hot smoke is very hard to bear. It quickly causes cough, spasm of the glottis, suffocative phenomena, pain in the throat, chest, and eyes, and redness and swelling of the conjunctiva. When a building becomes packed with smoke this vapor is filled with unburned combustible elements, and a sudden access of air will cause the smoke to take fire suddenly or to explode. So great is the force of such an explosion that a wall may be blown down or an entire building may collapse. This is the dreaded and deadly "back-draft," which comes without a second's warning, and which no skill or fore-

sight on the part of the engineer in command can serve to prevent. It is responsible for many deaths among firemen. A single inhalation of the flaming vapor will cause instant death by cardiac inhibition. A person further away will be blown over as by an explosion of powder, is certain to be severely scorched, and may be maimed or killed by falling from a window or a ladder; or he may be cast down upon the floor, to be overwhelmed with smoke or flame before his companious can remove him. At the very least, one exposed to a "back-draft" will be badly shocked, choked, and scorched; will be placed in danger of death from edema of the glottis; and for days will suffer with burns of the skin and with inflammation of the respiratory passages and eyes.

Firemen work in relays, and when one is at the branch-pipe in ordinary smoke he is able to realize that he is beginning to be overcome, or, as he usually expresses it, that the smoke is beginning to "get the best of him." He at once starts to leave the building, keeping his nose near the floor to get air, and crawling along the hose to avoid being lost. In this way, if he should drop before getting out, he will soon be found by a comrade, otherwise he might not be found in time to save his life. As he emerges from the building a fresh man crawls in along the hose and takes his place.

A man knows that he is about to be overcome by a growing desire to breathe with the mouth open and to take deeper and more frequent breaths, and by the development of singing in the ears, oppression in the chest, nausea, headache, giddiness, and muscular weakness. Usually, when in this condition, he succeeds in getting safely out of the building. Sometimes, however, he is lost in it and is killed. When he succeeds in getting out, as he strikes the fresh air of the street he staggers and often falls. If a physician is at hand he will observe that the fireman's lips and skin are livid, that the eyes are red and watering, that the skin is sweating, that the body and extremities are cold, and that the pulse is very weak and usually slow. In slight cases the respirations are rapid and deep; in more severe cases they are rapid and shallow, the inspirations being very feeble and the expirations being sudden and spasmodic. The patient complains of dyspnea, weakness, giddiness, nausea, cold, and headache.

After a man so affected has sat down for a few minutes in the fresh air, he usually reacts. He not uncommonly vomits, and then returns to work. A man that has thus been recently overcome is more liable, when he goes back to the building, to fall again than is a fresh man.

In more severe cases a man is carried out in a totally unconscious condition by his comrades. His head hangs backward and his mouth is often open, but sometimes his teeth are tightly clenched. The limbs are extended. The pulse is very weak and fluttering, or is imperceptible at the wrist. The extremities are very cold. The pupils are dilated and fixed, and the conjunctival reflex may be gone. The respirations are extremely shallow; the intervals between them are long, and inspirations are distinctly gasping. The face frequently twitches, and the limbs may show tremor, or even spasm. In some cases there is rigidity of the nature of opisthotonos. The eyes are prominent and suffused. The face and extremities are cyanosed. There is a froth about the lips, and this froth is sometimes bloody. The veins are extremely prominent. The cold, cyanosed skin is covered with sweat, and a state of actual collapse exists. Occasionally no rigidity is noted, but there is general muscular relaxation. These severe cases, when they react from the unconsciousness, are occasionally delirious for a brief period.

In more severe cases still the respiration has actually ceased, although the heart still beats. In these cases, besides the intensification of the symptoms already noted, there is involuntary evacuation of urine and feces, and frequently bleeding from the nose and rectum.

The slighter cases recover quickly in the fresh air, even without aid. Whenever a man is actually unconscious there is some danger. The greater the interval between respirations, the shallower the respirations, and the weaker the pulse, the greater the danger. When the respirations are very few and very shallow, and when they have ceased, the danger is very great and imminent.

Those who are slightly overcome go back to their work again; but even in a

light case, if a chill develops, the man should be made to go to a hospital. If a man is overcome a second time at one fire he should be ordered to a hospital. A severe case, after having reacted, should always be taken to a hospital, even if he protests against it, because he will be almost certain to develop a chill, will be sure to be overcome again if he gets into smoke, and, like a wounded man in a battle, will be in the way.

When a man is slightly overcome with smoke, he will, as previously stated, recover without treatment after sitting awhile in the fresh air. It is a good plan to rub his hands and dry his face. If he feels like vomiting, he should make no effort to restrain his inclination. Under no circumstances should whiskey be given by the mouth, as it prolongs the nausea and adds to the giddiness and headache. If the circulation is weak and a stimulant is needed, a hypodermic injection of atropine or of strychnine should be given. As a rule, when the man reacts, he can safely go back into the smoke, although, of course, he is more likely to be overcome than he was at the beginning. If, however, he has persistent nausea and feels weak, and especially if he has a weak circulation, it is unsafe for him again to enter the burning building.

The firemen themselves, when slightly overcome with smoke, are firm believers in the efficacy of yeast beer. They will rapidly drink a bottle of this beverage. This causes a gaseous distention of the stomach, frequent belching, and sometimes profuse vomiting. How it can be of benefit I do not know, but most of them assert that it is. It may do good by causing vomiting, for I am persuaded that vomiting often relieves the choked-up air-passages.

When a man is carried out severely overcome with smoke, he should be laid upon a blanket and active treatment should at once be instituted. Artificial respiration should be made immediately, and should be continued until the man breathes properly and has regained consciousness. If oxygen is at hand, this should likewise be administered. The cold extremities should be actively rubbed, hypodermic injections of either strychnine or atropine should be given, and a mustard plaster should be placed over the heart. As soon as the breathing has become satisfactory, the man is to be wrapped in a blanket and be taken to a hospital, a physician accompanying him. When he reaches the hospital his clothes should be removed, and his body and extremities rubbed with a coarse towel, warm blankets be wrapped around him, he should be surrounded with hot bottles, and be given an enema of hot saline fluid or hot coffee. A hot bath is a very efficient remedy. Further treatment is symptomatic. If he has not urinated for some time, a catheter ought to be used.

In many cases a violent chill will follow; in all cases the temperature will be somewhat subnormal. As a rule, the patient must remain in the hospital from twelve to twenty-four hours, when he can go home if there is no serious involvement of the glottis, bronchial tubes, or circulation; otherwise he must remain longer, and careful examination is to be made before he departs to see that there is no evidence of beginning bronchopneumonia or edema of the lungs.

Frequently, when a man is brought to a hospital after being seriously overcome with smoke, his eyes give him great trouble on account of a severe conjunctivitis. The first thing to be done for this condition is to use ice-water compresses continually, and occasionally to wash out the eye with a solution of boracic acid or with a dilute solution of salicylic acid. The eyes may trouble him for some days, and when he gets about it may be necessary for him to wear blue glasses and use an astringent eye-wash for a time.

In a very bad case, in which a man is at the point of death, the fight for life must be made on the fire-ground in the manner already directed; and artificial respiration should not be abandoned until the heart has positively ceased to beat for some little time. When breathing has been reëstablished, the patient should be taken to a hospital and treated as previously described. I have never seen a man who was breathing when brought out of a burning building die immediately of the effects of smoke; and I think it may be laid down as a rule that if the man is breathing he can be resuscitated.

There are rarely any severe after-effects from inhaling plain cold smoke.

There is usually cough for some days, with carbonaceous expectoration, and I have seen several instances of bronchopneumonia. If the smoke has been hot or has contained irritant matter, there is sure to be soreness of the pharynx, larynx, and trachea, and often soreness of the bronchial tubes. There is also considerable danger of edema of the glottis; hence, when a man has inhaled hot or irritant smoke, he must be kept in the hospital until this danger has passed.

The victims of a "back-draft" are usually scorched and shocked. They have often inhaled hot smoke, and may have received severe injuries from falls. They should be given stimulants before removal from the fire-ground, and then be at once taken to a hospital.

When a building has become filled with illuminating gas, an explosion may occur; but this rarely happens at a point of the building where the men are working, because they have been driven out long before the amount of gas has reached the explosion point. A mixture of one part of gas to eleven parts of air is the explosive mixture, but no man can live in a ten-per-cent mixture—in fact, a one-per-cent mixture of water-gas or a three-per-cent mixture of coal-gas will soon prove fatal. Illuminating gas, when present in these amounts in air, is extremely hard to tolerate, and it is very much more difficult to stand when mixed with smoke. Ordinary smoke principally tends to produce asphyxia, associated, of course, with some carbon-monoxide absorption. When there is illuminating-gas and smoke, there may be not only the symptoms of asphyxia, but also of actual poisoning by the gas itself. This gas combines with the hemoglobin and lessens the power of the red corpuscles to absorb oxygen. The degree of harm done by it depends, first, upon the percentage of gas present, and secondly, upon the duration of the exposure to it. If there is a large percentage present, the fireman will be rapidly overcome, but if taken at once into the air, will react with corresponding rapidity. If, however, he has been gradually overcome, he will react slowly and with difficulty. If he has been a long time in the gas he may perish.

As a rule, a man will have warning that he is about to be overcome with illuminating-gas; for even when a small amount only is present, he suffers with headache and great muscular weakness. When a great deal of gas is present, however, a man may be overcome very rapidly, without much preliminary inconvenience. As a general thing, a fireman conscious that there is gas in the building is extremely watchful. When preliminary symptoms occur he seeks the fresh air, and he must reach it much more rapidly than in the case of smoke. When he is going to be overcome he has violent headache, excessive giddiness, and very pronounced weakness in the legs, so that he is unable to stand. In ordinary smoke a man can crawl as long as he retains consciousness, but in an atmosphere of illuminating-gas he, as a rule, loses the power of motion before consciousness has been lost. As a general thing, he is carried out of the building, and loses consciousness during the transit or after having reached the open air; whereas, when overcome with smoke, a man that has not lost consciousness does not do so after once having reached the fresh air. He either loses it before this or not at all. When I see a fireman carried out of a building conscious, and note that he becomes unconscious when in the street, I take this fact as strongly significant of his having inhaled illuminating-gas.

As a rule, however, the victims of gas are unconscious when brought from the burning building. When one examines a man that is unconscious from the effects of illuminating-gas, one should remember that such cases do not die rapidly when in the fresh air, but that they will certainly live for some time, and that they very rarely die at all from a brief immersion of a gaseous atmosphere. I have had no personal experience with any fireman that has died from the effects of inhaling illuminating-gas, though I have seen a number that have been overcome by it—of course, after brief exposure. The very bad cases of gas poisoning occasionally seen in hospitals, in which fatality is common and in which coma often lasts two or three days, are usually people taken from rooms in which they have been breathing a gas-laden atmosphere for many hours. The problem is different in the case of a fireman, for we are then dealing with one that has been exposed to the gas for but a short time.

Such a man is generally found uncon-

scious, and the clothing smells of gas. There is very marked cyanosis of the ears, face, nails, and extremities, the color being sometimes blue-black and sometimes reddish-blue. The pupils are as a rule dilated, but occasionally they are contracted. In either case they rarely react to light. The patient's body and extremities feel cold to the touch; there is frequently a froth about the mouth; and as a rule the muscles are rigid. In some cases, however—and I believe that these are the most severe—there is complete muscular relaxation. The respiration varies; occasionally it is as stertorous as in apoplexy, but it is, as a rule, weak, rapid, and extremely shallow. At intervals there may be convulsive starts, and sometimes actual convulsive seizures. The pulse is extremely weak; it is usually rapid, but in some circumstances is slow. These symptoms may last but a few minutes, but usually last an hour or more; and the sufferer, as a general thing, becomes all right in a day or two. After the symptoms pass off the man feels heavy, drowsy, and giddy for a day or so, usually suffering with a violent headache. One should always bear in mind that even these comparatively slight cases have elements of danger and may be followed by prolonged coma, by bronchopneumonia, or by edema of the lungs. Twice I have seen delirious excitement of a hysterical type follow reaction from coal-gas coma. In one case the delirium lasted a few minutes, in the other it endured for several hours.

A notable difference between the cases of partial suffocation due to smoke and those due to illuminating-gas is that the symptoms of the former are temporary, and when they have once abated or disappeared, do not deepen or return; while the symptoms of the latter are frequently prolonged and are commonly variable. A coal-gas victim often improves and then grows worse, and may regain consciousness and lose it again. When a man has been overcome with smoke, and normal respiration and consciousness have been regained, the symptoms never return; but when he has been rendered unconscious through illuminating-gas, the condition oscillates, being now satisfactory and now highly dangerous, during a period, it may be, of hours. If death does occur from the inhalation of illuminating-gas, it commonly takes place in a state of coma and is due to edema of the lungs; but it may occur during convulsions.

The treatment of a man overcome with illuminating-gas is as follows: He is placed in the fresh air and lies upon a blanket. Artificial respiration is begun, and is continued until satisfactory restoration has been obtained; inhalations of oxygen should certainly be given (though oxygen is not nearly so serviceable in these cases as in those of ordinary smoke-asphyxiation, because carbon-monoxide cannot readily be displaced from the red blood-corpuscles, and because these corpuscles have largely lost the power of taking up oxygen). The extremities should be rubbed; a mustard plaster should be applied over the heart; and a hypodermic injection of strychnine or of atropine should be given. The moment that it seems safe to effect the transfer, the patient should be taken to a hospital; external heat should be applied and a hot enema given. If his condition is deemed serious, he should be bled and have a hot saline fluid infused into his veins. As a rule, from 12 to 20 ounces may be drawn by bleeding, and a larger amount of hot salt solution should be infused. It has been shown that in coal-gas poisoning bleeding with the transfusion of human blood is of more benefit than bleeding with the infusion of salt solution. Whereas the infusion of salt brings about distinct benefit, the benefit is but temporary; and a much more prolonged favorable influence is produced by the transfusion of living blood.

As a rule, a fireman may go home from the hospital the day after he has been overcome with coal-gas; but in other instances he may develop bronchopneumonia, tracheitis, laryngitis, edema of the lungs, or disastrous changes in the blood or in the nervous system. As a matter of fact, however, such late results are uncommon, because of the brief exposure. I have never seen one instance of late disastrous after-effects in a fireman. Illuminating-gas is more poisonous but not nearly as irritant as smoke. If mixed with air alone it rarely causes bronchopneumonia, but this lung complication may readily ensue on the inhalation of gas and smoke.

When a fireman inhales ammonia, he suffers with violent dyspnea and a terrible cough, because of spasm of the glottis and bronchial irritation. The eyes smart and water. He does not come to harm because he at once leaves the building, air or smoke containing ammonia being absolutely irrespirable. I have seen many firemen badly affected by ammonia, but none dangerously. The only death I know of was that of an employee of a brewery, who was in the burning structure when the ammonia pipe burst. Ammonia may cause almost instant death —may cause coma or may induce delirium. After coming out of an atmosphere containing ammonia, he should be treated by the inhalation of vinegar. A few whiffs of very dilute ammonia should be carefully given after the inhalation of acid vapors, and vomiting should be encouraged, for it may prevent disastrous respiratory complications. If chlorine or hydrochloric acid has been inhaled, the best treatment is the inhalation of steam. If chlorine, the vapor of nitric acid or hydrochloric acid, sulphurous acid or ammonia has been inhaled to any extent, the man's life will be placed in deadly peril from edema of the glottis; and it may be necessary to do an immediate tracheotomy. It is needless to say that such cases should be treated by artificial respiration, inhalation of oxygen, and the administration of stimulants, and should be promptly taken to the nearest hospital. As a matter of fact sulphurous acid and chlorine rarely attack the lungs, as a man does not attempt to remain in such an atmosphere.

When a surgeon on the fire-ground assumes charge of a fireman who has been brought out of a building unconscious, from inhaling smoke, gas, or some irritant vapor, he should at once inquire of one of the officers of the fire department whether the building is filled with pure smoke, or whether the smoke is mixed with illuminating-gas or irritating or poisonous vapors; and whether the smoke is hot or cold. If it is a cellar fire and numbers of men are being overcome, he should establish himself in a room in an adjacent building, where he can more satisfactorily carry out prompt means of resuscitation. Finally, each patrol wagon and each ambulance should carry, besides the ordinary emergency supply, a can of oxygen, a bottle of vinegar, some dilute ammonia, and a number of mustard plasters.

At a fire many men are often completely disabled by inflammation of the eyes. This is particularly likely to occur among those who work at a spice-mill fire or at a fire where there is lumber, furniture, peach-baskets, or anything made of wood. When a man cannot or will not leave his work, but purposes returning into the smoke, nothing can be done for him except to wash the carbon specks out of the eyes with boracic acid solution. At this period, novices occasionally drop cocaine into the eyes. This gives immediate but very transient relief, and is followed by a marked aggravation of all the symptoms. I have known dozens of firemen to be rendered helpless at one time by this having been done. When the fire is over, or when the man has been taken away to a hospital, cold compresses should be applied to the eyes for one or more days, as previously directed.

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## *TREATMENT OF PROSTATIC HYPERTROPHY.*

By Edward Martin, M.D.,
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(*Continued from p. 78.*)

When harassing frequency of urination is associated with a persistent residuum of more than four to six ounces of nonpurulent urine, it can fairly be assumed that the frequency is at least in part due to the lessened vesical capacity incident to the residuum, and that the complete evacuation of the bladder once a day may, by increasing its capacity as a reservoir, give the patient some hours of comfort. In these circumstances antiseptic irrigation of the anterior urethra, followed by evacuation of the vesical contents through a sterile catheter at bedtime, is advisable. When the residuum is from eight to twelve ounces, the maneuver should be repeated night and morning. If, however, the treatment is not promptly efficacious, it may be inferred that the frequent urination is due rather to a hyperexcitable reflex than to a lessening of the capacity of the bladder, and that stretching of the in-

ternal sphincter is the next procedure to be adopted.

The choice of the catheter which is to be used on prostatics, or which is to be given them to use on themselves, is a matter of the greatest importance. The fundamental rule in selecting the instrument is that the one should be chosen which enters the bladder with the least exhibition of force, and which gives the least pain to the patient. This condition is generally best fulfilled by the soft-rubber elbowed catheter. This should have solid ends and a beveled eye. They are so flexible that undue force cannot be applied through their shafts. Moreover, they readily adapt themselves to irregularities in the course of the urethra, and can be boiled without being injured. When the urethra is so obstructed by spasm or by encroachment upon its caliber by the prostate that the soft-rubber catheter will not pass, the woven elbowed instrument should be the next choice. This quickly deteriorates with use, and is ruined by prolonged or repeated boiling. An obstruction so great or a spasm so pronounced as to require the habitual use of a metal instrument calls urgently for surgical intervention.

The care of the catheter is a matter of only less importance than their careful selection. They are best stored in a metal box impregnated with formol vapor. A diploma case provided with a central core of wire or perforated metal, divided into the required number of compartments, answers well. In one cap of the case is placed a drachm of powdered paraform, and over this is spread a layer of absorbent cotton. The cap is then put on the case and fastened by a strip of adhesive plaster. The catheters are washed in soap and water. The soft-rubber instruments are boiled, the woven ones syringed and washed with bichloride 1:1000, dried with sterile gauze, put in their respective compartments, and the case is closed. It is well to have a supply of catheters sufficient for two days' use, each instrument as it is withdrawn being at once mechanically cleansed and dipped in a solution of bichloride 1:1000, or formalin 1:500. The instruments deteriorate if kept wet, and soft rubber is injuriously affected by all oily substances, hence lubrichondrin should be selected. This comes in compressible tubes and is clean. When patients pass the catheter upon themselves, they should be told to wash their hands thoroughly, dip their fingers in bichloride 1:1000, wash the portion of the glans about the meatus with a pledget of cotton dipped in the same solution, be provided with an irrigating bag containing one pint of hot argyrol 1:1000, or protargol 1:4000 solution, and a nozzle which fits into the catheter to be employed. The catheter properly lubricated is passed down to the compressor urethræ muscle, the irrigator is then attached to it, and the anterior urethra is flushed out, after which the catheter is passed into the bladder.

*Infection of the bladder* complicating retention of urine from enlarged prostate calls for direct medicinal treatment, not only because of the increased severity of the subjective symptoms nearly always consequent upon infection, and often so marked as to be absolutely crippling, but because of the imminent danger of involvement of the kidneys in the inflammatory process.

The treatment of vesical infection consists of draining the bladder of its residual urine, if there be this residual urine, and washing it out with antiseptic solutions. If, in spite of this treatment, the infection persists, and is attended by symptoms of increasing severity, and especially if urinary fever develops with its pronounced constitutional symptoms of septic absorption, and if careful examination fails to show the presence of stone, continuous catheterization associated with antiseptic irrigations is indicated. In either case urinary antiseptics are administered by the mouth and in small doses, lest their irritant effect upon the kidney should predispose this organ to an ascending infection.

*Bladder irrigations* are conducted by means of a gravity bag and short urethral nozzle, or such form of catheter as is most easily and painlessly introduced into the bladder. This is usually the elbowed, soft-rubber catheter. The short urethral nozzle should be employed only when the patient can empty his bladder with comparative ease and completeness by the voluntary act of micturition.

The soft-rubber catheter is attached to a fountain syringe, which should be sus-

pended two feet above the level of the bladder. Its eye is introduced as far as the membranous urethra, and the anterior urethra is thoroughly flushed. The catheter is then passed for one-half inch, and the flushing is continued until four to six ounces have been introduced, or until the patient experiences an urgent desire to urinate. The catheter is pushed inward until its eye lies within the internal vesical sphincter, and the contents of the bladder are allowed to escape. This flushing is continued until the return flow no longer contains pus and mucus, when with the irrigating fluid still flowing through the catheter the latter is slowly withdrawn.

The solutions employed should be of the temperature of the body or a little above it. Those of choice are boric acid, a drachm to a pint; Thiersch's solution (salicylic acid 3ss, boric acid 3iijss, water Oij); mercurol, 1:2000 in normal salt solution; argyrol, 1:4000 to 1:1000; protargol, 1:4000 to 1:2000; or normal salt solution. Where the inflammation is of long standing without marked constitutional symptoms, and characterized by a large quantity of pus, silver nitrate, 1:100, preceded and followed by irrigation with boric acid, may be serviceable.

When practicable, this antiseptic flushing should be practiced each time the catheter is passed for the purpose of emptying the bladder. The solution of choice should not be irritating, and in actual practice it will be found serviceable to change the solution from time to time.

When this treatment, combined with the proper hygiene, diet, and medicine, is inefficacious, or, in its mild form, painful and irritating, or if in the course of it there should develop chill, fever, and anorexia, or mild or severe septic symptoms with or without lumbar pain and tenderness, continuous catheterization is indicated.

*Continuous Catheterization.*—For this purpose as large a catheter as can be introduced easily is selected, preferably one of soft rubber. It is attached to an irrigating bag, and passed into the bladder in the manner described when considering bladder irrigation. It is important that its eye should lie just within the internal vesical sphincter, since in this place it gives rise to so little irritation that it can be worn for days or weeks. If the self-retaining catheter—an admirable instrument for this purpose—is employed, its proper position is determined by slight traction, the expanded tip then catching on the narrowing made by the internal vesical sphincter. When the soft-rubber elbowed catheter is used, the one which will usually be found most serviceable, its proper position may be determined by injecting between four and eight ounces of antiseptic solution into the bladder and slowly withdrawing the catheter until the stream ceases to flow. The instrument is then pushed back until a free flow is reëstablished. The position of the meatus upon the shaft of the instrument is marked by a thread, and the catheter is tied in place by means of threads, securing it to adhesive strips placed on the sides of the penis. A measured quantity of antiseptic solution is then injected into the bladder and allowed to flow out. If the catheter is properly placed, it should all escape. The free end of the catheter is put into a urinal, and is observed for a few minutes, that the surgeon may be sure that the urine escapes drop by drop. If this is the case, the urinal is placed between the patient's legs at a level lower than that of the bladder, and is partly filled with an antiseptic solution so that the end of the catheter is submerged in the latter. The bladder is allowed to drain into this urinal. Twice a day the bladder and urethra are thoroughly flushed with an antiseptic solution, the catheter being withdrawn far enough to allow the injected fluid to escape from the meatus, and then being pushed back to its former position. By this means a troublesome urethritis may be prevented, though the wearing of a catheter will always cause a mucopurulent discharge from the urethra.

The soft-rubber catheter should be changed at least every fifth day. The woven gum catheter should be changed at least every second day, since the life of the latter instrument when secured into the urethra is extremely brief. A metal instrument should not be tied in the bladder. Under this treatment urethral fever subsides promptly. The patient is usually entirely comfortable, and many cases of inveterate and painful cystitis are so greatly benefited that the ordinary pur-

suits of life can be resumed. Some cases appear to be cured.

The success of this treatment depends upon securing free and continuous drainage, and this is incident to the permeability of the catheter and its retention in the proper position. It may be blocked by blood-clots, or possibly by a thick mucopurulent discharge. It is usually obstructed because it is allowed to slip forward. Unless the catheter is held absolutely in the proper position and is kept open, this treatment is useless. When skilfully applied it is one of the safest and most successful means of treating acute attacks of cystitis, which so frequently complicate obstruction from prostatic enlargement.

*(To be concluded.)*

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## *A CRITICAL STUDY OF TUBERCULIN AND ALLIED PRODUCTS BASED UPON A COLLECTIVE INVESTIGATION.**

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When our worthy president requested me to prepare a paper to be read before this section treating upon the subject of tuberculin and allied products, I thought best to make the basis of the paper a collective investigation. Accordingly I sent out three hundred and twenty-five letters to some of the leading clinicians of this country and Europe, taking pains to include the names of those whom I knew to be especially interested in the subject of tuberculosis, requesting answers to the following:

1. Have you had personal experience in the use of tuberculin or other culture products in the treatment of tuberculosis?

2. How many cases have you treated? What was the average period of treatment? What was the result of treatment?

3. What is your opinion of their value, and do you favor their use in the treatment of tuberculosis?

I have received one hundred and forty-three replies answering my questions either wholly or in part. That you may know the value of this investigation I will mention that replies have been received from such leaders in the crusade against tuberculosis as Schroetter and Weismayer, of Austria; Gehrhardt, Dettweiler, Weicker, Krause, Goetsch, Bandelier, Gebhardt, Johne, Koehler, Rietschel, and Moeller, of Germany; Turban and Spengler, of Switzerland; Brouardel, of France; Giovanni, of Italy; Ransome, Heron, Latham, Mackenzie, Semon, Yeo, and Saundby, of England; and Trudeau, Bowditch, von Ruck, Loomis, Stubbert, Solly, and Denison, of the United States; and from many more besides who occupy eminent positions as clinicians.

For the kind and painstaking replies of those who assisted me in this investigation I wish here to openly express my appreciation. The cordial letters which I have received show an interest which is highly gratifying, and indicate that the profession does not bear that hostile attitude toward these remedies that it formerly did. While the medical profession is naturally conservative, yet it is progressive, and is constantly taking advantage of new methods of curing disease, and today it stands ready to sanction at least, if not adopt generally, any remedy or any method that will aid in the cure of tuberculosis, that disease which has so long baffled its skill.

An analysis of the replies to my inquiry shows the probable reason why certain members of the profession have failed to secure satisfactory results from the use of these culture products, while others have obtained such gratifying results.

Of the one hundred and forty-three who replied, thirty-two, or 22.4 per cent, recommended their use; fifty-two, or 36.3 per cent, did not recommend them; while fifty-nine, or 41.3 per cent, expressed no opinion at all. Of the fifty-two who did not recommend them, thirty-four expressed themselves as not being opposed to them, but simply not being convinced of their value; although twelve of these acknowledged that the remedies had contributed to cures in their hands. Eighteen were absolutely hostile.

Of those replying, the answers were based on personal experience in fifty-four

*Read at the thirtieth semiannual meeting of the Southern California Medical Society, at Pasadena, California, December 3 and 4, 1902.

instances. Of these, thirty-two, or 60 per cent, believed these remedies to be of value in treatment, while twenty-two, or 40 per cent, did not recommend them.

This is a much better showing than I thought possible. These remedies have certainly gained friends during recent times. It was a great surprise to find that 38 per cent of those expressing an opinion were favorable, and only 21 per cent absolutely hostile. No less a surprise was it to find that 60 per cent of those who had had experience with the remedies recommended them.

Thirty-four gave me an opinion as to the diagnostic value of tuberculin also. Of these only one was opposed; but he was so terribly afraid of the remedy that he was not sure that it should even be used upon cattle. He certainly has not read the statistics of veterinarians upon this point. Bang has collected reports from numerous tests made upon cattle without ill results following in a single case. McEachran[2] reports 22,023 cattle tested in which harm was not recorded in a single instance. Jones, of Rochester, in a letter to the writer, relates his experience upon cattle during the past four years. He has tested 12,000 animals without observing ill effects, and says that examination of the carcass after slaughter always verified the diagnosis. From his experience he is enthusiastic over the test both for cattle and man. Dr. J. M. Anders[3] collected statistics of 3638 tests given upon the human subject, and reports that ill effects were not recorded in a single instance. Koch[4] also has observed over 3000 tests upon the human subject without harm. Certainly these experiences should be sufficient to place the tuberculin test upon a safe basis.

Judging from the replies received, much of the disappointment and failure to observe improvement upon the part of those who have tried tuberculin and other culture products, as well as of the harm done, has been due not only to an insufficient understanding and faulty application of the remedies, but also to an inadequate knowledge of the disease which they were attempting to treat. General practitioners and surgeons began the employment of tuberculin without any special preparation or fitness for the work, and the result is about what should have been expected, about the same as would be produced if the same men without any previous preparation should begin to examine eyes and fit glasses. With such a trial, condemnation would be a foregone conclusion.

When Koch gave tuberculin to the world, medical men knew little of tuberculosis. Even the pathologists knew little of the minute pathology of the disease. Few men had ever paid close attention to its clinical course. Tubercular patients had never been watched day by day from the time the disease made its first invasion of the tissue. When men began observing, as was necessary in the administration of tuberculin, they were surprised to find that the disease runs an uneven course, and not knowing what else to ascribe the unfavorable periods to blamed many of them upon the remedy. Patients may get worse, as many of them do, under hygienic and dietetic treatment —periods of absorption, fever due to mixed infection and cavity formation, are apt to come in all cases at all far advanced —but this is not ascribed to the treatment. Let this same thing happen if culture products have been used, and it is ascribed to the remedies. When post-mortems were made on tuberculin-treated patients during the early period of its use, everything found was attributed to the remedy; when exactly the same thing could have been found in cases treated without it, or in those without treatment. I want to emphasize this one point: The effects of culture products upon the course of tuberculosis cannot be judged without an understanding of the natural clinical course of the disease; neither can the post-mortem effects be judged without a knowledge of the post-mortem findings where culture products are not used. So, as essentials to successful tuberculin treatment, I would place a knowledge of the natural course of the disease, a thorough training in pathology, and the ability to interpret the pathology ante mortem by the clinical course and physical signs.

No less essential is it to understand the remedy to be applied. It is not only necessary to know what it will do, but

[2]McEachran: Transactions of the British Congress on Tuberculosis, vol. iv, p. 114.
[3]Anders: Trans. Am. Clim. Ass., 1900.
[4]Koch: Trans. Brit. Cong. on Tuberculosis.

equally necessary to know what it cannot do. The application of remedies to disease is a responsible study. This responsibility increases with the gravity of the disease to be treated and the activity of the remedy to be employed. Therapeutic exactness, although always to be desired, is absolutely necessary at certain times. Suppose that a physician hears that strychnine is a good remedy for giving tone to the nervous system, and that, in order to obtain best results, it must be given in ascending doses. Without studying the remedy, he begins. Soon the patient has a convulsion. He gives him another dose, larger, because in order to obtain results "it must be given in ascending doses." Another convulsion occurs. Soon the patient dies. It is very likely that this physician would ascribe the death of this patient to the remedy instead of to the improper use of it; and, of course, would fear to use it ever after. Such an order of therapy gave tuberculin a stunning blow when it was first introduced. No one knew much about it, and, furthermore, no experience had been recorded from which to gain knowledge. If there ever was a remedy that demanded therapeutic exactness, it is tuberculin. Here we have a disease which is grave and a remedy most powerful—powerful for good, if administered rightly; powerful for evil, if administered wrongly.

That the hostility to culture products is due to therapeutic inexactness is shown by my replies. Of the eighteen hostile critics, nearly all based their opinion upon trials of tuberculin when first introduced. Few of them have tried the newer preparations, which are more perfect, nor have they learned the careful manner of employing them now in use.

Those who recommend them base their opinions upon a total experience of 5742 cases treated. Those who do not recommend them have had experience in 813 cases.

Of those who did not recommend them, only four had had an extensive experience. One treated 150 cases from four weeks to twelve and fifteen months. He says: "Curative value, especially in the hands of the general practitioner, is doubtful. Further experience in sanatoria and under close inspection for long periods seems advisable."

Another, who had experience in about 100 cases, does not give the average time of treatment, but says that he saw no advantage over ordinary treatment except in five or six cases.

Another used old tuberculin and tuberculocidin for three years after their introduction, treating 230 cases from five to ten weeks, with negative results. He does not "at present favor their use, but favors keeping an eye on this line of treatment."

A fourth treated 141 cases from three and a half to four and a half months, but abandoned it in the year 1891. He does not consider the newer preparations as dangerous, but does not believe that they would be active in the small doses recommended.

It is noteworthy that none of these men are hostile in their attitude. Two of them have had no experience in recent years.

Aside from these four, only one man tried the remedies on a case for as long a period as six months, and only two others had tried them as long as three months. The rest mention from two weeks to two months. So, of the fifty-two men who did not recommend them, only six (granting that the one who treated 100 cases used the remedies more than three months) had tried the remedies on a case for three consecutive months. It takes three months to cure a very early stage case; and the danger of relapse is lessened if the time is extended longer. So we can say that, in the light of recent developments in the use of culture products, the failure to recommend them on the part of those who answered my inquiries (and I believe the same will hold good throughout, for my answers are from representative men) was based, with few exceptions, upon faulty and insufficient trial.

Contrast the short period of treatment employed by those who do not favor their use with that of those who favor it. Of the latter, one man was convinced of their value by trying them for two months. Three gave three months; and the remaining twenty-eight gave from three months to more than one year as the time necessary in order to bring about a cure. Petruschky[5] believes the best results are

[5]Petruschky: "Zur Koch'schen Tuberculin Behandlung." Rep. Berlin Cong.

obtained by extending the treatment over several years, giving a course of a few months each year.

I did not undertake to gather statistics as to the stage of the disease in which the trial was made, but many made mention of it in their replies—enough to show that it was not made in suitable cases. When a new remedy is on trial, it should be used in cases over which it is known to have an influence, and then, after succeeding in these, it is time to experiment in new fields.

The test of a remedy is that it should do what it is recommended to do. Than this no more can be asked. Will antitoxin cure diphtheria? Yes, if administered early. Will it cure when the patient is moribund? It is not likely to do so. This is not held against antitoxin, however earnestly we wish that it might control these advanced cases. The success of antitoxin treatment depends upon the earliness of its administration, and in spite of the fact that men have failed to secure results in severe, advanced cases, the remedy stands approved, for antitoxin will do that for which it is recommended.

Culture products are remedies to be used in *tuberculosis*. That is what they are recommended for. *They are not represented as having any influence over dead tissue, or as being able to regenerate cells that have been destroyed.* If they will contribute to the cure in pure tuberculosis—that is, in incipient cases before mixed infection, or breaking down with absorption, occurs—they will do all that should be asked of them. They will then stand as remedies of value in treatment. Unfortunately, tuberculosis is a chronic disease, and results are obtained slowly. If culture products could produce their results as quickly as antitoxin, their adoption would be quick and certain. Few men have the patience to work and wait months for the result; but unless they do, they must not hope to become successful phthisiotherapists.

That these remedies will do what is claimed for them is proven by the results obtained by those who have had experience with them, as shown in the following:

Jessen[6] treated 14 first-stage cases, curing 14, or 100 per cent.

Goetsch[7] treated 356 first-stage cases, curing 278, or 78 per cent.

Trudeau[8] treated 24 first-stage cases, curing 20, or 83 per cent.

Von Ruck[9] treated 105 first-stage cases, curing 98, or 93 per cent.

Rembold[10] treated 16 first-stage cases, curing 12, or 75 per cent (six years after).

Turban[11] treated 20 first-stage cases, curing 20, or 100 per cent.

Wilkinson[12] treated 12 first-stage cases, curing 12, or 100 per cent.

Petruschky[13] treated 18 first-stage cases, curing 18, or 100 per cent.

Klebs[14] treated 14 first-stage cases, curing 14, or 100 per cent.

Pottenger[15] treated 10 first-stage cases, curing 10, or 100 per cent.

Here we have for consideration 589 cases in the first stage of the disease treated with tuberculin and allied products. Of this number 496, or 84.2 per cent, were apparently cured. This is certainly enough cases upon which to base an opinion, and our verdict must be that culture products stand the test and accomplish that for which they are recommended, namely, the cure of pure tuberculosis. This is all the more emphasized when we compare these results with those obtained without culture products in the same purely tubercular cases:

Bowditch[16] treated 66 first-stage cases, curing 39, or 59 per cent.

Clapp[17] treated 82 first-stage cases, curing 53, or 64.6 per cent.

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[6]Jessen: *Centralbl. f. inn. Med.*, 1902, No. 23.

[7]Goetsch: Personal letter to the writer.

[8]Trudeau: Trans. of the Ass. of Amer. Physicians, 1900.

[9]Von Ruck: *Journal of Tuberculosis*, vol. i, p. 23; Clin. Rep. of Winyah Sanitarium, 1899 and 1900; *Therapeutic Gazette*, May, 1896.

[10]Rembold: Quoted by Wilkinson. *British Medical Journal*, June 7, 1902.

[11]Turban: Beiträge zur Kenntniss der Lungentuberkulose.

[12]Wilkinson: Observations on Tuberculin as a Remedy in Treatment of Tuberculosis of the Lungs. *British Medical Journal*, June 7, 1902.

[13]Petruschky: Specifische Behandlung der Tuberculose. Paper before the 71st assemblage of the German Naturalists and Physicians, Munich, 1899.

[14]Klebs: *Berlin klin. Wochenschrift*, 1902, No. 23.

[15]Pottenger: Unreported.

[16]Bowditch: Report of Mass. State Sanatorium at Rutland.

[17]Clapp: *Ibid.*

Trudeau[18] treated 300 first-stage cases, curing 204, or 68 per cent.

Stubbert[19] treated 163 first-stage cases, curing 95, or 58 per cent.

This table furnishes us with 611 cases, all of which were not only in the first stage of the disease, but all of which had the advantage of sanatorium treatment. Of this number 391, or 64 per cent, were apparently cured. Now we must admit one of three things: either the difference is accidental, or those who use culture products are the abler men and more successful in their treatment, or that culture products do contribute materially to the cure. The first we cannot believe, and if either of the latter alternatives be true, they speak well for the remedies, for if the ablest men in the field of phthisiotherapy are convinced of the value of these remedies, we should certainly give their opinions weight; and, on the other hand, if they are no more skilled but are able to produce better results, curing 20.2 per cent more patients by the use of them than can be cured without them, we should certainly be convinced of their value.

It is a notable fact, and one which my replies bear out, that nearly all men who have determined to give culture products a thorough test have become convinced of their value. As stated above, only five men who had given them a trial of six months failed to recommend them. On the other hand, those we had given them a trial of several months in suitable cases, and whose experience had extended over several years, with the exceptions mentioned, recommended their use.

As further proof of their worth, I will cite the comparative results obtained with and without the remedies by two of the world's leading lung specialists—Trudeau of Saranac Lake, and Turban of Davos-Platz. Trudeau's experience I will quote from my former paper on "Culture Products in the Treatment of Tuberculosis."[20]

"Twenty-four cases were treated with the remedy, of which 20, or 83 per cent. were apparently cured; and 113 without, of which 82, or 72 per cent, were apparently cured—a slight percentage (11 per cent) in favor of tuberculin. He then chooses 50 patients discharged as apparently cured with tuberculin since 1894, and 50 patients corresponding in lesions and time of treatment who were cured without tuberculin, to see the relative permanency of cures. Three of those treated with tuberculin could not be traced, so three were dropped from the list of those treated without tuberculin. Of the remaining 47, 41 remained well, one had relapsed and was living, 4 had relapsed and were dead, and one had died of insanity. Of the 47 treated without tuberculin, 36 remained well, 6 had relapsed and were living, and 5 had relapsed and were dead. So we see 82 per cent of those treated with tuberculin remained well, not counting the one dying of insanity, as against 72 per cent of those treated without it, a balance of 10 per cent in tuberculin's favor; or, putting it in another way, at the end of the time considered, 68 per cent of those treated with tuberculin remained well, and 52 per cent of those treated without tuberculin remained well, a balance of 16 per cent in favor of tuberculin."

The experience of Turban is so interesting and so to the point that you will pardon me if I quote it as described by Weicker[21] at length:

"(*a*) Turban treated 21 cases in stage III with tuberculin: in 8 there was tuberculous laryngitis; 9 cases survived five years, three more remained alive four years, only 5 out of 21 died within two years—25 per cent. Only one died of miliary tuberculosis, and that six and one-half years after treatment; none died of hemorrhage. Hence tuberculin does not increase risk of hemorrhage or generalized tuberculosis. Three were quite well six years after—in all, 5 were well. Tubercle bacilli disappeared from the sputum in 4 cases. Of cases treated in other ways—that is, without tuberculin—61 out of 84 died—5 from hemoptysis, 3 from tuberculous meningitis; 41 out of 84 died in less than two years—nearly 50 per cent. Compare this with 25 per cent under tuberculin treatment.

"(*b*) Forty-eight cases in stage II were treated with tuberculin: 9 died within two years of treatment, 3 in three years and

[18]Trudeau: Reports of Adirondack Cottage Sanitarium.

[19]Stubbert: Reports of Loomis Sanitarium.

[20]Pottenger: *Therapeutic Gazette*, January, 1903.

[21]Weicker: Beitraege zur Frage der Volksheilstaetten, p. 22.

more, 16 were alive six years after treatment, 5 more five years after treatment, 3 more four years after treatment—in all, 36 were alive. Thus of 48 cases, 36 were alive and 12 dead. Of 152 cases treated in the ordinary way, 45 were dead and 107 alive, but the figures show greatly in the favor of tuberculin treatment, because of the 107 a great number (49) had been under treatment more than one or two years.

"(*c*) Twenty cases in stage I were treated with tuberculin. Tubercle bacilli in sputum in 17. All were well: 10 of them six years after treatment, 2 more five years after, 1 more four years after, 3 three years after, 2 two years after, and 1 one year after treatment. In all the tubercle bacilli disappeared from the sputum. The three cases giving no tubercle bacilli in sputum had to pass through the ordeal of the tuberculin test. On the other hand, 57 cases, in which tubercle bacilli were not found in sputum, were treated in ordinary ways. They were not subjected to tuberculin test. Of the remaining 22 cases, there was one death, and in 2 cases there was still tubercle bacilli in the sputum. Turban himself says: 'Now, if we compare the results in early cases in which tubercle bacilli were found in the sputum, the result is substantially in favor of tuberculin treatment.' Of the 86 cases with tubercle bacilli in the sputum treated with tuberculin, 45, that is 52 per cent, yielded a permanent result; of the 241 cases with tubercle bacilli in sputum that received no tuberculin, 95, that is 39.4 per cent, gave a permanent result. Still more distinctly does the effect of tuberculin show itself, if we ask how many of these cases are now free from tubercle bacilli in their sputum. Of the 86 tuberculin patients 41 are now free from bacilli—47 per cent. Of the 241 not treated with tuberculin, only 66 —27.4 per cent."

For further statistics on the comparative success of treatment with and without culture products, see my former paper.[22]

If the fact that all those men who are devoting their energies to the treatment of tuberculosis, and who have given tuberculin and allied products a fair and extended trial, have found them to contribute immeasurably to the cure; if the fact that those who use them cure a larger proportion of their cases than those who do not; if the fact that, in the hands of the same men, a much greater percentage of cures can be made with them than without them is to be given consideration, then we must give these remedies a very important place in the treatment of tuberculosis. It has often been said that the same results could have been produced without their use as has been with them. The mere saying of this is not argument; but I wish to mention a few experiences which refute it. Unless he be very much prejudiced, the man who treats the cases should be best able to judge whether or not the remedies contributed to the result.

Lucius Spengler[23] says: "In the discussion which my former success provoked, they say that here at Davos they obtain equal success without tuberculin, and that it is difficult to distinguish the part that has been contributed to the cure by climate and the part by tuberculin. I simply wish to say that of the 39 patients whom I have treated and whom I am still treating with T. R., 30 had been with me six months or more, some even several years, before T. R. was made known."

Thorner[24] says: "I have cured poor patients with tuberculin who could not go to a sanatorium, and some others who were very poor and who had failed to be cured by several courses of treatment at different sanatoria."

Denys[25] certainly has put the remedies to a test, so that his results leave no doubt as to the part that was contributed to the cure by them. He treated 174 cases, curing 51 or 29 per cent, nearly curing 12 or 6 per cent, and improving 64 or 36 per cent. He designates those as cured who have no more bacilli in the sputum, whose general condition is satisfactory, and who no longer react to tuberculin. He says of these: "The tuberculin treatment covered an average period of seven

[22]Pottenger: *Ibid.*

[23]Spengler, Lucius: "Contribution a l'etude du traitment de la tuberculose par T. R." Translated from *Deutsche med. Wochenschrift*, 1897, No. 36.

[24]Thorner: Tuberkulin und Tuberkulose, Leipzig, 1901.

[25]Denys: "Action curative de la tuberculin, Denys, contra la tuberculose." *Ann. med. clin. du Hainaut*, March, 1902.

months. No other method was used, neither rest, air, nor medicine."

This is a creditable showing and compares favorably with the best results obtained in sanatoria, where rest, fresh air, and the best of food are provided; nevertheless, the friends of these products do not believe this to be the right way to use them. Oliver[26] says: "Of patients who remain nine months under treatment in the Adirondack Cottage Sanatorium, 34.5 per cent go away apparently cured." Gabrilowitch[27] says that as a result of ten years of treatment at Halilia, Russia, 1000 cases have been treated and 253, or 25.3 per cent, apparently cured, and 472, or 47.2 per cent, improved.

The idea seems to have gained ground in the minds of some men that tuberculin treatment and general hygienic and dietetic treatment are to be contrasted. Such an idea is absurd. The only contrast is between those cases treated with it and those treated without it; for rest, exercise, fresh air, diet, hydrotherapeutic measures, and measures for the building up and strengthening of the patients are used by every one who pretends to cure tuberculosis, no matter what remedy or remedies he employs. Artificial digestants will sometimes help stomach troubles, but their effect is heightened by the use of a properly regulated diet. The surgeon's knife removes the tumor, but the regulation of the patient's life promotes recovery. So it is with culture products. Whatever preparation is used is only one of several aids in the production of the cure; and he who does not use all is to that extent negligent of his patient.

The cure of an infectious disease consists in establishing immunity. In acute infectious diseases this is established soon or the patient succumbs; in chronic diseases, however, immunity is established slowly and often not at all.

Hansemann[28] says that when a tuberculous process extends beyond a single lobe, the chances are that it will not heal of its own accord. In these cases help from the physician is required, and if it were obtained earlier there would be little need of such extensive processes as we so often see occurring. The physician's part in treating tuberculosis, either when it is pure tuberculosis or when it has reached the consumptive stage, consists in fortifying the patient against the disease. He orders hydrotherapeutic measures, rest and exercise, fresh air, and a nutritious diet, that a state of perfect nutrition may be attained, and that the body cells may become resistant to, the disease. In the loose way in which we use the term, he is trying to make the tissues immune or increase the natural immunity of the patient. He can do more than this. He can induce an artificial immunity. Kitasato, Spengler, Koch, von Ruck, and others have by the use of culture products rendered animals immune, so that when doses of virulent bacilli were injected into them the disease did not spread beyond the local ulcer which formed at the site of injection. Another proof of this immunity, aside from that shown upon experiment animals, is the phenomenon of agglutination. Vaughan and Novy[29] say: "It should be understood that agglutination is only one of various indications that the body juices of immunized animals rob their homologous bacteria in part of their virulence. Why agglutination does not take place in all instances we are not as yet able to determine; but when it does occur, it is an indication that the blood of the immunized animal has some detrimental effect upon the growth and virility of the microörganism." Koch,[30] Moeller,[31] as well as several other experimenters, have shown that by the use of tuberculin the agglutinative power of the blood can be raised from 1 in 10 to 1 in 300; and furthermore, that an improvement in the general health accompanies the rise. This should be sufficient proof to establish the immunizing power of these remedies. Happily, clinical evidence corroborates these facts, for when treatment is begun in an early case of tuberculosis the patient seems to become immunized; so that the

[26]Oliver: *Jour. Amer. Med. Assn.*, October, 1900, p. 1006.

[27]Gabrilowitch: *Zeitschrift f. Tuberkulose u Heilstaettenwesen*, Bd. iii, p. 207.

[28]Hansemann: "Ueber Heilung und Heilbarkeit der Lungenphthise." *Berlin. klin. Wochenschrift*, Aug. 11, 1902, p. 747.

[29]Vaughan and Novy: Cellular Toxins, 1902, p. 180.

[30]Koch: *Deutsche med. Wochenschrift*, 1901. No. 48.

[31]Moeller: *Zeitschrift für Tuberkulose und Heilstaettenwesen*, 1902, p. 302.

disease shows less tendency to extend to healthy tissue than is usually the case, and also, when an apparent cure has been attained, there is less tendency to relapse.

With this positive, scientific proof of the immunizing power of culture products, and the corroboration which it has secured at the hands of those who have had large experience in their use, we conclude that where culture products are not used in those cases which are suitable, the patients are deprived of one of the agencies which would contribute materially to their cure.

With such proof as to their value, should these remedies be employed generally, or should their use be confined to specialists? Upon this point many of my answers were emphatic, the writers taking the ground that where there was so much hope for those afflicted with tuberculosis bound up in given remedies, it were better that their use be confined to those who understand them until such time as their exact mode of administration and the exact part contributed by them to the cure might be fully determined. This opinion has been well expressed by editorials in the *Journal of the American Medical Association* and the *British Medical Journal* during the past year, which I will quote: "In the hands of those who have used this preparation (tuberculin) most faithfully and continuously, and, therefore, it is to be assumed, most intelligently, the results have been most gratifying; but tuberculin is a powerful agent, and it has shown its ability for evil as well as good. In the absence, therefore, of a remedy possessing specific curative properties and susceptible of safe *general* employment, the clinician is forced to depend upon those natural resources by which the resistance of the organism to the activities of the tubercle bacilli are increased."[32] And later:[33] "With a better understanding of the way in which it is to be used, and of the cases which are suitable for its employment, tuberculin now seems about to enter on a period of usefulness as a curative agent."

"This T. R. was proved to possess distinct immunizing properties, and its curative effects were demonstrated upon tuberculous animals. It has now been before the profession for some years, but does not seem to have been much employed, although there is good evidence that it possesses the properties claimed for it by its discoverer. . . . It is perhaps as well that there should be no *general* desire to resume trial of this and similar remedies, for there can be little doubt that until their mode of production has got far beyond its present imperfect stage, the use of these preparations ought to be restricted to those who clearly understand the nature of the materials with which they are working."[34]

The tone of these editorials leaves no doubt as to the value of tuberculin. It is to be hoped that it will become more generally used, but it is further to be hoped that no one will attempt its employment who will not first thoroughly study the remedy and thoroughly acquaint himself with the disease, as to its physical signs, clinical course, and pathology. Then, with patience and perseverance and a thorough control of the patient to be treated, he should proceed cautiously, ever recognizing the importance of his work and the end to be attained.

I now wish to quote some of the opinions as expressed in the letters and monographs received during this investigation, in order to show the attitude of the profession toward these remedies. For obvious reasons I will not mention the names of the writers in connection with the letters, but where I quote from a published article I will cite the reference.

Here is a characteristic letter from one who does not recommend the remedies: "Experience with old tuberculin in eleven cases—eight for several weeks, and three for three or four months. One seemed practically cured. Heard from her at the end of one and two years. Treated two with watery extract of tubercle bacilli. Under all these serums and some other kinds of so-called specific treatment many patients improve for a time, gaining in weight, coughing less, and even showing a lessened proportion of bacilli in the sputum. I know of no

[32] Editorial: *Journal of the American Medical Association*, March 29, 1902.

[33] Editorial: *Journal of the American Medical Association*, Aug. 16, 1902.

[34] Editorial: *British Medical Journal*, Jan. 11, 1902.

cures from any of them alone. Of course, my little experience is not enough to base an opinion on, but I am quite sure from it, added to that of others, that we have not yet struck the right thing."

Another writes: "I have treated twenty cases from three weeks to two months. Treatment resulted in no improvement, but fortunately no accidents. My opinion is unfavorable."

Another says: "Have used Koch's tuberculin, 1891, T. R., and oxytuberculin. Treated eight cases from two to six months. Result: in some cases negative; in others, especially the early cases, the patients seemed to break down more rapidly than usual. My reading and experience alike make me doubtful of their value."

Another: "Treated a few cases. Results were unsatisfactory and bad. I believe it of very little if any value, and I do not favor its use. I discarded it myself because I believed it harmful."

Still another says: "Have not used it myself, but observed ten cases under others. Do not recall period of treatment. In one case there was recovery. I have not seen or heard of a recovery or improvement that could not have been brought about under equally good environment by other treatment. I believe the method to be dangerous in unskilled hands, and unnecessary in skilled ones."

Now I wish to give some of the opinions on the other side. One man says: "Have used it constantly since its discovery by Koch, restricting its use to patients at the sanitarium who are under close observation and who are treated free. Have treated perhaps 100 to 125 cases, averaging about five months, with generally encouraging results. I favor their use in hospitals and sanatoria, and by men thoroughly familiar with this form of treatment, in suitable cases only. Their indiscriminate use in acute and febrile cases is not admissible."

Another: "While I recognize that tuberculin is not a cure for all cases of tuberculosis, yet I have noted that it has contributed immeasurably to the cure in cases which, under dietetic, hygienic treatment at the sanatorium showed no signs of healing. I hold the combination of hygienic, dietetic, sanatorium treatment with tuberculin treatment as the most useful in all those cases which present a doubtful prognosis, with a possibility of cure. I have treated about 100 with the new tuberculin; cannot say how many with the old. Treatment lasted over a period of several months, and was given with intervals of rest between."

Another writes: "Have used old tuberculin, T. R., and baccillus emulsion in 446 cases, treating on the average 130 days. Seventy-eight per cent have been discharged as cured, and all of those have been under my observation more or less ever since, some since 1891. I hold that Koch's tuberculin as applied in purely tuberculous cases, and by the method described by me, is a specific remedy against tuberculosis, and at present the best treatment."

Another says: "Have used them for ten years in about 300 cases with good results. The use depends largely upon the proper selection of cases and the exclusion of those already overtaxed by the care of toxins appreciated by their non-resistant systems. Diagnostic skill and knowledge of technique become then most important essentials to the successful use of this immunizing method."

Spengler[35] says: "Thus with the careful choice of cases, the judicious application of T. R. has given me only good results, and I consider it at the present time as a very valuable remedy in phthisiotherapy."

Heron[36] says: "In properly selected cases, with proper surroundings, and proper care, tuberculin can be used, not only with safety but with distinct benefit in the treatment of tuberculosis."

Moeller[37] says: "According to our experience (in the sanatorium at Belzig) we consider tuberculin as an extraordinarily valuable remedy in connection with sanatoria. More observations are needed to determine which cases are most suitable to the old preparation, and which

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[35] Spengler: "Contribution a l'etude du traitment de la tuberculose par T. R." Published in pamphlet form from *Deutsche med. Wochenschrift*, 1897, No. 36.

[36] Heron: Report to the Committee of Management of the City of London Hospital for Diseases of the Chest, March 21, 1901.

[37] Moeller: Ueber die diagnostische und therapeutische Verwendung des Tuberkulins." *Zeitschrift für Tukerkulose und Heilstaettenwesen*, 1902, p. 302.

are suited to T. R.; but as to the curative value there is no doubt."

Petruschky[38] expresses the hope that the personal fight which was shown in the bitter opposition to tuberculin is now to be laid aside, and that the next decade will see the sanatorium and tuberculin treatment everywhere used in combination. He says: "The combination of the physical-dietetic treatment, alternating with the tuberculin treatment, is at the present time the most satisfactory treatment for those cases of pulmonary tuberculosis which are not too far advanced. The proper use of tuberculin for diagnostic and therapeutic purposes has been so well worked out by years of experience of a few painstaking men that it is now possible for the well informed physician to avoid all mishaps in its use."

From the answers received during this investigation I would draw the following conclusions:

1. The interest of the medical profession in tuberculin and allied products is increasing, and its attitude is gradually becoming less hostile.

2. The attitude of the profession in Europe is more favorable than in this country.

3. The greatest opposition comes from those who were unfortunate in their experience when tuberculin was first introduced, and those who, although they have had no experience, base their opinions upon this early trial, discrediting the work of recent writers upon the subject.

4. Not one man who had given the later remedies an extensive trial, in suitable cases, failed to observe benefit from their use.

5. The disapproval and rejection of the remedies in most instances was based on faulty application and upon trials in unsuitable and far advanced cases.

6. Those who have studied these remedies most carefully, and who have exercised greatest care and judgment in the selection of their cases, have, almost without exception, been convinced of their value; and they have been able to report enough cases to prove that these remedies will do that for which they are recommended.

7. Basing an opinion on the results in 1200 first-stage cases, 611 of which were treated in sanatoria by the usual dietetic and hygienic methods, and 589 by the same careful management plus tuberculin and allied products, we find that, of those treated in the latter manner, 20.2 per cent more were cured than where the tuberculin preparations were omitted from treatment.

8. In patients treated with tuberculin and allied products there is less tendency for the disease to spread to new tissue, and when an apparent cure is attained there is less danger of relapse.

9. Tuberculin and allied products are fast becoming established as therapeutic measures in the treatment of tuberculosis, and are worthy of the earnest attention of the medical profession.

[38]Petruschky: "Der gegenwaertige Stand der Tuberkulin-behandlung," 1901.

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## *OBSERVATIONS UPON THE HYPNOTIC ACTION OF HEDONAL.*

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The search for a satisfactory hypnotic is never-ending. The ideal is found only in the healthy tire of the sound brain in the vigorous body, and its effect the dreamless God-given sleep of youth. Man has produced many counterfeits thereof, but no one who has ever experienced the ideal is deceived. And when the brain is wearied with the cares of life and the body worn by disease, the tire is there, the fatigue, but it does not bring relief; its healthfulness is gone; it is nerve-wearing, and lest the strain grow too severe we must seek a remedy to calm the troubled spirit and bring the peace of sleep.

That the old and tried hypnotics are not entirely satisfactory is particularly apparent to all workers among those suffering from nervous and mental diseases. The wards of a hospital for the insane afford all degrees and varieties of insomnia, and the stubborn resistance of many cases to hypnotic drugs taxes the resources of the physician. Any drug is welcomed therefore which offers a reasonable assurance of being applicable to some case which is otherwise unyielding, or in which conditions contraindicate those already at hand.

One of the recent additions to the large and growing family of hypnotics is hedo-

nal—and one for which a field of usefulness is apparent. My attention was first called to this hypnotic two years ago, and it was used in a few cases with good results. During the last year, however, I have used it more and observed its action with greater care. After a quite considerable experience with it I am impressed with the belief that it has a hypnotic value rather greater than that of sulphonal or trional, not as long continued as that of paraldehyde or chloral, but safer in its action than any of these. It seems to be entirely devoid of any ill effect upon the organism, safe in the presence of valvular heart lesions, and effectual in producing from four to eight hours of quiet sleep, from which the patient awakes refreshed. Its action is manifested in from one-half to one hour after administration. Its field of usefulness is in cases of neurasthenia, hypochondriasis, melancholia of the milder types, and various nervous diseases attended by insomnia without marked mental excitement or great motor restlessness. In maniacal conditions it does not produce hypnosis, except in those subacute and chronic cases where the mental excitement is not of a continuous and exhaustive type and the motor activity is not excessive. I have not administered it in any case continuously, never more than four successive nights, and have had no opportunities to judge as to the occurrence of any cumulative tendency. An examination of the literature of hedonal and of the studies of its physiological action informs us of its rapid elimination from the body and the improbability of such an event.

The following cases are not all those which have been given hedonal by us, but are sufficient to illustrate the conditions in which we have found it serviceable.

CASE I.—Chronic mania; aged fifty-four. She has been bedridden and an irritable, noisy paralytic for eight years. Has suffered much from insomnia, in the effort to relieve which an opium habit was formed seven years ago, but soon broken up. Has occasionally been given hypnotic doses of paraldehyde or chloral hydrate, but of late no hypnotics have been administered because of an organic heart lesion. She was given hedonal 15 grains at 8 P.M. Slept from 8.30 for seven hours. There was no effect upon the pulse or circulation; no drowsiness or after-effects the following day. On two or three occasions this dose has been repeated with good results.

CASE II.—Recurrent mania; aged forty. She has attacks of mania lasting from two to three months. During these she is destructive; in constant motion and noisy by day, talkative and wakeful at night. She was given hedonal 15 grains at 8 P.M. At 8.50 P.M. she was asleep and slept four hours. The following night slept five hours upon a 15-grain dose, sleep ensuing forty minutes after its administration.

CASE III.—Melancholia with agitation; aged forty-nine. There was profound mental depression of eight months' duration with extreme negativism, confusion, and agitation. Patient was frequently out of bed, at times upsetting the furniture and struggling with the nurse. At 9.15 P.M. she was given 15 grains of hedonal. In seventy-five minutes she was asleep, awaking five and one-half hours later, and was quiet until morning. The following night, the same conditions being present, 15 grains was given at 9.15. She was asleep in thirty minutes, but awoke at midnight, very noisy and agitated. At 12.30 A.M. the 15-grain dose was repeated, and at 1.15 A.M. she went to sleep for four hours. A few nights later she was given 15 grains of hedonal at 9.15 P.M. Again went to sleep after thirty minutes, but only slept one hour, when she again became noisy, crying out and disturbing the ward. At 10.45 was given another 15-grain powder, and in forty-five minutes went to sleep. This time she slept quietly for six hours.

CASE IV.—Acute melancholia; aged eighteen. Four months' duration. She had been hypochondriacal for a year. Had overworked at school and in housework. There was a strong hysterical element in the case. She was a light sleeper, and was much disturbed at night by restless patients about her. She had passed several sleepless nights. At 9 P.M. 15 grains of hedonal was given. From 10 P.M. she slept six and one-half hours. The following night, upon the same dose at the same time, she slept seven and one-half hours after ten o'clock. The third night she went to sleep forty-five minutes after taking a 15-grain dose, and did not awaken for eight hours. On two subsequent occasions 15-grain doses were followed in one-

half hour by sleep lasting six and one-half and five hours respectively.

CASE V.—Melancholia with stupor; aged thirty. This patient had been ill several months. She was mute, rigid, stood in fixed attitudes, resisted the services of the nurse, and often refused food. For a few nights she had been restless, getting out of bed and pacing the floor—not resisting when put into bed, but persistently getting up. She was given hedonal 15 grains, and after thirty minutes slept for five and one-half hours.

CASE VI.—Acute melancholia; aged thirty-five. She had been depressed for three months with delusions that people were talking about her, that her husband was unfaithful, etc. Had frequent severe attacks of migraine for many years. There was marked insomnia. A 15-grain dose of hedonal was without effect. The following night 30 grains was given. The patient went to sleep in one hour and slept soundly eight hours. This experience was repeated several nights, seven or eight hours of sleep being regularly obtained.

CASE VII.—Acute melancholia; aged thirty. Duration six months. There was much mental distress present, with delusions of self-depreciation and of persecution. At night she was quiet as a rule, but often would be restless and unable to remain in bed. On such an occasion 15 grains of hedonal was administered. In about thirty minutes she went to sleep, not to awaken for seven hours.

CASE VIII.—Senile degeneration; aged seventy-seven. She has been very restless during the day, fearful of losing all property and of becoming an outcast. Dreads the night for fear she will not sleep. Generally sleeps quite well, however, but an occasional hypnotic is necessary. She is very apt to awake at two or three and be wakeful until morning. On several occasions a 15-grain powder of hedonal at 9 P.M. has been productive of very happy results, the patient getting six or seven hours of quiet sleep. About one hour has usually elapsed before the hypnotic action. No ill effect upon her circulation has been apparent. She has sclerosed arteries and an impaired heart.

CASE IX.—Chronic insanity, with mysophobia; aged fifty-eight. This patient has been feeble and anemic for many years. She had suffered much from insomnia at times. During a period of discomfort by day and restlessness at night 15 grains of hedonal was administered at 9 P.M. At 9.30 she was asleep and slept eight hours.

CASE X.—Chronic dementia; aged forty. This patient has been many years insane and suffering from occasional periods of agitation, with great motor activity by day and complete insomnia. For a week had been talking and pacing the floor at night. She was given 30 grains of hedonal at 8 P.M., and before 9 P.M. was asleep. She rested quietly all night, being still asleep when seen by the night nurse at 5 A.M. On another night she rested equally as well after taking a similar dose.

CASE XI.—Acute confusional insanity; aged forty-two. A case of great mental confusion of one month's duration, a temperature two or three degrees above normal, rapid but strong heart, great restlessness, and much muscular incoördination. She was especially noisy and agitated at night. Hedonal 20 grains was without effect. An attempt to get the patient to take a second dose was unsuccessful. A month later she had so far improved as to be mentally clear and rapidly regaining her physical strength. She still was troubled by broken and restless sleep, however. Again hedonal was tried in 20-grain doses. Sleep ensued one hour later, and was quiet and unbroken for seven hours.

CASE XII.—Sane; aged twenty. Patient was simply nervous and sleepless from overwork. Hedonal in 15-grain doses at bedtime was productive of four or five hours' sleep on three successive nights.

CASE XIII.—Acute melancholia; aged thirty. A mild case of melancholia of six months' duration. Improving, but having an occasional night of wakefulness. Hedonal in 15-grain dose did not act well, but on two or three nights a dose of 30 grains has brought several hours of quiet sleep.

CASE XIV.—Acute mania; aged sixty-four. She has been maniacal for six months, the attack coming on suddenly. During the day is in constant bodily activity, roaming about, talking, singing, dancing, etc. At night up and about her room talking and shouting. One hour after taking 30 grains of hedonal she slept for seven hours. This dose was repeated four nights with a like result. Of late she

has improved and is sleeping more, but at times gets suddenly excited and does not sleep. She is therefore given a 30-grain powder when she has had one or two restless nights and another is probable. The drug has always acted favorably in the case, and a comfortable night followed its administration.

CASE XV.—Puerperal mania; aged eighteen. A severe case of mania with extreme restlessness, fever, exhaustion, etc.; phlegmasia dolens. Hedonal was twice given in 30-grain powders, but was not retained long enough to get any effect. Six weeks later she had so far recovered as to be free from all acute symptoms, without fever and strong physically. She was incoherent and still noisy during the night at times. Hedonal was again tried in 30-grain doses, and followed by eight hours of quiet sleep.

CASE XVI.—Acute mania; aged fifty-five. She had two attacks of mania thirty years before, made a good recovery, and remained well until the sudden onset of the present attack, induced by overwork three months ago. She has been very active, violent, and incoherent. The usual hypnotics were unproductive of results. Hyoscine hydrobromate, grain 1/50 hypodermically, would hold her but three or four hours. Hedonal 15 grains was given. An hour and a half later slept a little over an hour. The following night the same dose had no effect. The third night she was given 30 grains at 8 P.M.; no effect. At 9 P.M. 15 grains was given, and at 9.30 P.M. another 15 grains. She remained noisy all night, however. All of the following forenoon she was very quiet, but did not sleep. Her pulse, which had been running about 100, was 90 per minute, her temperature 100°. She had been having a temperature ranging from 99° to 102° since her admission. Sixty grains of hedonal had been given within one and a half hours, but absolutely no ill effect was manifest.

CASE XVII.—Epilepsy; aged thirty-four. The patient was a confirmed epileptic, with periods of irritability, nervousness, and insomnia. Hedonal 15 grains given at 9 P.M.; was followed by sleep at 10.30 P.M., lasting seven and a half hours.

CASE XVIII.—Asthma; aged sixty. The patient suffered somewhat from asthma during the day, but at night there was more dyspnea and aggravating insomnia. Hedonal in 15-grain doses was several times productive of seven or eight hours sleep, the hypnotic effect being produced in about forty-five minutes.

CASE XIX.—Chronic delusional insanity; aged sixty-eight. She generally slept well, but was having a mild attack of the influenza and was sleepless. Concerning this she was deluded, asserting that she was kept awake by the evil influences of other patients. A 20-grain hedonal powder was taken and followed by seven or eight hours of sleep.

CASE XX.—Acute melancholia; aged thirty-one. Duration four months. Her residence has repeatedly been changed because she thought people talked about her, etc. She was despondent, suffered from disordered digestion, emaciation, and nervous debility. While in conversation trembled violently from head to feet. Worried constantly during the day and suffered much from insomnia. This was not relieved by dormiol or trional, and hedonal was tried, at first in 15-grain doses, with four or five hours of sleep as a result. This sleep was light and broken. Later 25-grain doses were used, and this patient slept seven hours undisturbed.

All of these cases have been watched for any unfavorable or disagreeable effect which the drug might produce, but nothing whatever has been noted—no drowsiness, heaviness, or subjective sensations of cranial discomfort have been experienced. Neither has there been any digestive disturbance. The respiration and heart action have in every case been unaffected. The drug was given in every case as a dry powder placed upon the tongue and washed down with hot water. A few patients have refused it because of its disagreeable taste. None of those here reported complained of this, with one exception. Many have asked to have another powder on subsequent nights. I have administered the drug in capsule, but the size of the capsule shocked the patient, and doubtless the dry powder would have been more readily swallowed. I have also given it in syrup and mixed with sugar, but these do not effectively conceal the taste. Undoubtedly its administration in wafer would be best. The dose given has varied from 15 to 40 grains. The former dose is rather too small for good results. The best action has been obtained from doses of 20 to 30 grains. Only in very refractory cases is a larger dose necessary.

## *AN INQUIRY INTO THE VALUE OF THE IRRIGATION METHOD AS A MEANS OF ABORTING AND TREATING ACUTE SPECIFIC URETHRITIS.**

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As the irrigation method of treating cases of acute gonorrhœa is largely in vogue throughout the United States, and as patients are continually brought under our cognizance suffering from the various forms of chronic urethritis associated with inflammatory lesions of the sexual organs in direct anatomical relation with the urinary tract—which, in many instances, are undoubtedly brought about by using this method of treatment—it would seem that a brief review of the subject, from its first introduction to the notice of the profession, would perhaps be of interest.

Nine years have elapsed since Janet, of Paris, published an article in the *Annals of Dermatology and Syphilis* (3d series) entitled, "Abortive Treatment of Gonorrhœa by Means of Permanganate of Potash." In spite of the claim of quick cures, and prevention of complications, a length of time elapsed before it began to be generally adopted in this country. The profession was skeptical as to the claims made for its brilliant results. This was probably due to the disappointment which had followed the employment of retroinjections of hot water suggested by H. Holbrook Curtis, and of the continuous irrigation with a hot solution of mercury bichloride recommended by Dr. W. S. Halsted, which at the outset seemed to offer more benefit to the patient than the conservative methods then in vogue, but resulting after a fair trial, by a large number of observers, in being found valueless and often dangerous; the employment of these remedies having been found to be attended with great discomfort to the patient and being frequently accompanied by severe complications, such as acute posterior urethritis, seminal vesiculitis, prostatitis, and cystitis.

The popularity of this mode of treating acute cases of gonorrhœa is largely due to the writings of Janet, Goldberg, Frank, Folicke, Swindbourn, and Valentine, who all warmly advocated its adoption. As a result it is at this time employed by a large number of physicians throughout the country. Valentine in his book entitled "The Irrigation Treatment of Gonorrhœa" says: "In 1894 not a dozen men in the world were using the irrigation method of treatment of gonorrhœa, whilst by the middle of 1899 it was being employed by over six thousand physicians."

Those who will consult the literature of this subject for the past four years will find that the profession has gradually become divided into two parties differing materially in their views with regard to the value of employing the irrigation method of treatment. On the one hand, and by far the more numerous, are found genito-urinary specialists of large experience and a great number of general practitioners. The other side, although in the minority, is composed chiefly of genito-urinary surgeons, whose positions and reputations are such that any statement emanating from them is entirely reliable; they are men who are acknowledged authorities, whose experimental experience best qualifies them to express an opinion of the value and dangers of this mode of combating the disease, and whose views necessarily carry great weight. The opportunities of the general practitioner to observe and treat cases of gonorrhœa are necessarily limited, as patients, as a rule, usually consult the family doctor, and hence the cases are generally distributed among a large number of physicians. Many individuals, however, prefer to place themselves under the care of a specialist rather than to apply to a physician whose time is occupied with general medicine. The average practitioner therefore has but little opportunity to observe the result of the irrigation mode of treatment, and cannot form a definite conclusion as to its value from a large experience; he is carried away by the statements of enthusiasts, and misled by the brilliant results claimed by those who recommend this method. A long period must necessarily elapse before he becomes acquainted with the views of those members of the profession who are most competent to pass judgment upon the subject.

*A paper read February 11 before the Philadelphia County Medical Society.

As the opinion of the profession regarding the advisability of employing this method of treatment is divided, one side making extravagant claims for quick cures and prevention of complications, the other deprecating its employment, claiming that the disease is not aborted, or even shortened in period, that its employment is conducive to the production of chronic urethritis and inflammatory lesions of different portions of the genito-urinary apparatus, it has occurred to us that an examination into the positions held by the two cliques would probably not be devoid of interest. If the claims made by the opposition, that this method of treatment is fraught with dangers to the patient, are correct, the general practitioner should be made aware of the fact, that it may be abandoned. It is proposed to sum up the testimony presented by both sides, to analyze the result of our experience, which is a large one, and attempt to make some logical deductions which may possibly throw additional light on the controversy and assist in settling the question. Those who advocate the irrigation method of treatment by means of a solution of potassium permanganate claim that the purulent discharge, associated with the onset, is changed in from five to twenty days to one mucoid in character, which soon becomes serous; the urethra finally getting to be perfectly dry. The inflammatory symptoms are quickly subdued, complications occurring less frequently than by any other method of treatment.

Goldberg claims (*Centralblatt für die Krankheiten der Harn und Sexual Organe,* Band vii, Heft 3, 4) that sixty per cent of cures is effected in ten days, thirty per cent in fourteen days, and that ten per cent are not benefited. The failure in one-half of the ten per cent of cases which are not cured is said to be due to the disregard, on the part of the patient, of the instructions of the surgeon to eschew alcoholic beverages and indulgence in coition. No explanation is offered for the failure which resulted in the remaining percentage of cases. Valentine (*loc. cit.*) writing on this subject says: "No other method can show ninety per cent of cures in fourteen days."

Janet states that irrigation of the urethra twice daily with solutions of potassium permanganate of varying strength in the incipient stage of the disease will effect a cure in five days, but in the majority of cases the treatment will have to be continued for from ten to fourteen days. He admits that he has seen relapses occur in some instances on discontinuing the treatment, when he directed that the irrigation should not be resumed for the space of eight days. No reason is given for fixing this arbitrary period for recommencing treatment. He also states that in some instances, after the permanganate solution has been discontinued, a mucoid discharge remains, for the relief of which irrigations with a solution of silver nitrate, or the employment of astringent injections, are recommended. It is very singular that this chronic urethral discharge, which is associated with a sticky condition of the meatus, is mentioned by all those who enthusiastically advocate the employment of the irrigation treatment as a very common sequence of this mode of combating the disease. It is claimed, however, that the condition is harmless and that the patient is cured. The claims made of the advantages derived from the irrigation treatment of acute urethritis by those who advocate its employment may be summarized as follows:

It will abort the disease while still in its incipiency, and will effect a quick cure in cases of purulent gonorrhœa. The stage of decline is hastened, the purulent discharge is changed in from five to twenty days to one serous in character; the urethra finally becoming absolutely dry. Inflammatory symptoms promptly subside. Complications occur less commonly than by any other method of treatment. Lavage of the urethra is performed without the injurious effect of having to insert the instrument into the canal for the purpose. As a posterior urethritis follows, as a consequence, in almost all those cases in which the anterior portion of the urethra is affected, it can be treated by direct application of the medicament to the diseased surface, without the aid of a catheter, by employing the method suggested by Felki, thereby avoiding injury to the urethra.

On the other hand, those who condemn the irrigation treatment state that the quick cures claimed are not obtained. In a few instances it may be possible to abort the disease, provided the patient is seen

within twenty-four hours after the appearance of the symptoms; whilst the discharge is mucoid in character, a microscopical examination showing it to consist of epithelial cells, gonococci, with an absence of pus. Unfortunately, a patient rarely comes under the care of a physician in the incipient stage of the disease, so that an attempt at abortive treatment is of little practical value. As a rule, when first seen, the discharge is already purulent; the gonococci have insinuated themselves beneath the epithelium, and the chance for the employment of an abortive measure is lost.

It is admitted that the stage of decline is hastened; that the discharge is soon transformed into one mucoid in character, which gradually becomes serous; which condition has a tendency to become chronic and persist despite the most careful treatment. The gleety discharge is due to a periurethral cell infiltration that takes place beneath the mucous membrane, and lessens the caliber of the canal, which on examination will be found to be thickened, irritable, and congested. In some instances this new cell infiltration interferes with the contractile power of the urethral muscles, and as a result dribbling urine, at the termination of micturition, is frequently an annoying sequence. It is claimed that relapses more commonly occur after Janet's method of treatment than where less heroic measures have been adopted.

In order to carry out the process properly a special apparatus devised for the purpose has to be employed, which to be applied with safety requires to be handled by one who has had experience in the manipulation of urethral instruments. Especially is this the case when it becomes necessary to irrigate the posterior urethra by means of hydrostatic pressure. Other minor objections are that the treatment causes great discomfort and annoyance, is troublesome, as well as expensive to the patient, and as he necessarily sees the physician twice daily, much time is consumed; hence it becomes almost impossible to carry out the treatment in detail in ordinary dispensary work, as well as difficult for a surgeon whose clientele is large to find the necessary time.

To substantiate the statements here expressed as representing the views of some of the most experienced genito-urinary surgeons, quotations from some of the standard text-books as well as from prominent medical journals will be submitted.

"The Practical Treatise on Genito-urinary and Venereal Diseases and Syphilis," by Robert W. Taylor (page 67), says: "It is appropriate here to call particular attention to the tendency very prevalent to-day to treat gonorrhœa in the acute stage in a heedlessly heroic manner. We read of cures being produced in five, eight, twelve, and twenty days, and persons not thoroughly versed in the knowledge and treatment of gonorrhœa may be influenced by these dazzling and misleading claims. The scheme of these treatments consists in the use of some antiseptic drug (preparations of mercury, silver, potassium permanganate, and others), either in very strong solutions or in irrigations given several times a day, very hot. These treatments certainly cut short the severe symptoms and quite promptly cause the purulent discharge to become mucopurulent. These results are then paraded as astonishing, and cases presenting them are looked upon as having been cured. When these enthusiasts are asked in what a cure consists, they reply, 'There may be some little redness of the mucous membrane left and a little sticky discharge, but the patient is all right.' It is hard to understand how intelligent men can thus deceive themselves. Many patients thus treated, knowing little of gonorrhœa, consider themselves cured; others see that they are really not cured, and they disappear, and their cases are registered on the books as cures. Then, again, in this sticky condition antiblennorrhagics and the usual astringents are used to complete the cure; but if they are successful, the credit is given to the heroic remedy which calmed inflammation and more or less rapidly changed the character of the discharge.

"In the majority of these cases there can be no doubt the patients are not in any sense cured. They have been rapidly pushed into the terminal stage, which in many cases has no end. Now, if we study these cases carefully (as, so unhappily, it is our frequent duty to do) in the light of the pathology of the gonorrhœal process and of their pathological course, we see that the treatment has caused a much greater exudative inflammation into the submucous connective tissue than is seen in cases temperately treated, and that the catarrhal inflamma-

tion has been brought down from suppuration to the production of a thick mucopurulent secretion. This is shown by the decidedly full, tense, and thickened condition of the pendulous and subpubic urethra, and by the examination of the urine, which, strange to say, is not insisted upon by the authors of these rapid-transit treatments, as they are called. Then the patients, if they have escaped epididymitis, have symptoms of posterior urethritis, urethrocystitis, and often bladder incompetence or more or less incontinence. They often further suffer from urine dribbling, which is due to the infiltration into the urethral walls, which prevents the canal from performing the final expulsive acts of urination. As time goes on this exudative process, which involves nearly if not all of the anterior urethra, and perhaps the posterior part also, produces connective tissue, and as a result the canal is more and more constricted, until in some very bad cases a condition bordering on stenosis is left, accompanied by all the distressing conditions incident to blockade of the bladder. This picture is not in one particular overdrawn, but is based on the unbiased study of cases of acute gonorrhœa which have been railroaded into the terminal stage."

Eugene Fuller (Diseases of Genito-Urinary System, page 182) says: "Personally I advise against irrigation in any form during the acute stage of all primary attacks of gonorrhœa. It can be used with advantage sometimes during the acute stage of gonorrhœa, in individuals who have previously had the disease, and in whose urethræ the gonococcus does not find a perfectly fertile soil, and consequently does not show an active tendency to bury itself deeply beneath the epithelium."

Speaking of the Janet method of treatment, he says: "It is much in vogue at the present day. Some advocate it in acute gonorrhœa, although most conservative authorities do not. In the stage of decline of a gonorrhœa, the method certainly does act in an effectual manner in subduing the disease as far as it concerns the urethra, and if in man there existed a urinary apparatus distinct from a sexual one, or, in other words, if the urethra led only to the bladder and not also by the ejaculatory ducts to the seminal vesicles, the treatment might be an ideal one. Unfortunately, however, for this treatment, the ejaculatory ducts do connect with the urethra, and the surgeons, it seems to me, who report such enthusiastic results from the Janet method are those who ignore the existence of a genital tract. A gonorrhœal seminal vesiculitis is not an easy disease to cure, and any treatment, no matter how brilliant it may be in other respects, which in any way invites such a complication, ought to be either avoided entirely or else used most guardedly."

W. T. Belfield (*Progressive Medicine,* December, 1900): "The so-called Janet irrigation method with permanganate solutions has failed to secure in most hands the brilliant results published by its ardent advocates; indeed, it seems probable that the chief benefit is conferred by the hot-water irrigation of the entire urethra rather than by the dissolved salt.

"It is only after the acute stage is passed (say the tenth day) that the Janet method should be used, if at all. It has been quite largely abandoned both because of its inefficiency and its tendency to provoke inflammation of the deep sexual organs."

Statements on similar lines have also been made by Prof. M. Zeissl, of Vienna, Austria (*Journal of Dermatology and Genito-Urinary Diseases,* March, 1902): "Notwithstanding our etiological knowledge, in spite of all our endeavors in a therapeutic direction to bring about a rapid and complete cure of gonorrhœa when it has invaded the male urethra, we must concede that up to the present time we are not yet in a position to say that we are able to effect a cure with absolute certainty of gonorrhœal urethritis, no matter whether we make use of astringents or antiseptic measures."

Robert Holmes Greene (*Journal of the American Medical Association,* Nov. 9, 1901) says: "The believers in the irrigation methods of treatment of acute urethritis received a powerful recruit a few years past in the person of Dr. Janet, whose method of irrigation by permanganate of potash has had so many followers in this country. Theoretically, the advocates of these methods are, according to the laws of modern pathology, in error, their idea apparently being either that the gonococcus can be killed by di-

rect administration to it of some substance inimical to its existence, or that the soil may be rendered unsalubrious for it to breed upon, or that the substance injected being kept continually present on the urethral wall, when the gonococcus emerges from the deeper layer of the urethra, it is there to put an end to its career; or, as one of the advocates of recurrent irrigation suggests, the gonococcus can be knocked off the walls of the urethra and washed out at the same time. Eight years ago the writer claimed that local treatment for urethritis should not be commenced until the acute symptoms had subsided; that is, from six to eight weeks after the onset of the disease. His belief, at that time, was founded on clinical experience and conformed to the pathological laws as at that time understood. Recent discoveries in pathology and his further experience in dispensary and hospital work have tended to render them more positive. The list of genito-urinary surgeons who hold the same belief comprises many prominent men and seems to be increasing in size. Such wonderful results, though, are claimed to be shown by clinical experience by the advocates of irrigation methods in the early stages of urethritis, that their claims must be considered seriously, although their views are not apparently in conformity with pathological laws, nor is the evidence furnished by them as to the presence or absence of the gonococcus by microscopical examinations of the secretions alone of scientific value. It seems there must be some fire where there is so much smoke. It tends to discredit somewhat, to an unbiased mind, belief in the views of those who claim that acute urethritis is an ephemeral disease capable of being cured in a very few days by any process of irrigations, to find that the advocates of such irrigations differ so widely as to the proper material to be used for their solution. The list of such substances is only partially filled by the mention of permanganate of potassium, mercury, ichthyol, etc., *ad infinitum*. There is some evidence which goes to show that they render the patient more comfortable by these methods; that a purulent discharge is more quickly changed into a mucopurulent one."

Follen Cabot, of New York (*Philadelphia Medical Journal*, Jan. 26, 1901) says: "The advocates of irrigating the front urethra in the early stages of gonorrhœa claim that much can be accomplished by large volumes of hot medicated solutions. One method used in these solutions is the so-called Janet method—that is, washing out the whole urethra and bladder by overcoming the resistance of the shut-off muscle. This method I believe to be too energetic in the acute stage, and when the front urethra is alone involved, unnecessarily thorough; if we had to deal with a urethral tract alone it might do, but considering that the genital organs are intimately connected with the urethra, this treatment is liable to produce complications, and is therefore, in my opinion, in acute gonorrhœa unsatisfactory and dangerous."

G. Frank Lydston (Text-book of Genito-urinary, Venereal, and Sexual Diseases) says: "Notwithstanding the establishment of the microbe of virulent urethritis, there has been no remarkable improvement in methods of treatment. Bacteriologists who have implicit faith in the gonococcus have shown that the disease infects the mucous membrane and submucous cellular tissue so thoroughly that repair cannot take place in marked cases until the layers of affected cells have been replaced by new and insusceptible connective tissue and epithelial cells. *This proves that nothing short of complete destruction of the affected tissues can possibly abort virulent urethritis when once thoroughly established.* Attempts to abort the disease should therefore be made only in its incipiency. To be effectual, any form of germicide treatment must be applied within a few hours after the inception of the disease. The gonococcus causes irritation of the urethral mucous membrane very soon after its introduction into the canal, and if the germ be destroyed *in loco*, the disease, not having yet fairly begun, may be said to have been aborted, or perhaps more properly speaking, prevented."

Abner Post (Ready Reference Handbook of Medical Sciences) says: "The washing out of the urethra with large quantities of hot water before applying a curative injection promised great results and was extensively tried, but has been abandoned. Various antiseptic methods have been put forward as successful by their inventors, but in the hands of others

none of them have been better than the older methods."

James R. Hayden (Venereal Diseases) says: "Although this method (speaking of the Janet method of treating acute specific urethritis) does cause a rapid cessation of the purulent discharge as is claimed by its advocates, it leaves the urethra in a thickened, congested, and irritable condition, which gives rise to a thin, watery, or mucoid discharge, which is very difficult, and in some cases impossible, to cure."

Henry H. Morton (Genito-urinary Diseases and Syphilis) says: "The permanganate irrigation is a valuable method of treating gonorrhœa, but these claims as to its advantages would seem to be extravagant. According to the experience of other men who use this form of treatment, it is impossible to attain any such results, and many specialists have given up the method in disgust after a fair trial. The profuse purulent discharge is checked, in most cases, in about eight days; but even under treatment relapses, accompanied by a free discharge of pus, occur in nearly every case, without apparent cause, and often several times. These relapses yield promptly to irrigations of permanganate, but the convalescence is retarded, and the irrigations have to be continued daily to hold the pus in check and to control the thin, serous discharge which lasts after suppuration ceases. The course of the case is in this way dragged out; so that at least one month, and very often two months or more, are required to effect a cure."

Hyde and Montgomery (Syphilis and Venereal Diseases, page 386) say: "This method is both disagreeable and expensive in that it calls for much time on the part of both the patient and physician. Moreover, the brilliant results claimed for it by its advocates are not obtained through its use in the hands of other equally skilful operators. In common with other competent observers, we believe the method does not shorten the course of gonorrhœa, but that, on the contrary, it leaves the mucous membrane of the urethra in a thickened and congested condition from which it is slow in recovering; that this method increases the liability to epididymitis, prostatitis, and other complications; and that in the hands of any but an expert it is a dangerous method of treating the acute stage of urethritis."

Dr. R. H. Loux (personal communication) says: "I have long since abandoned the irrigation method of treatment in cases of acute gonorrhœa, having found it unsatisfactory and often dangerous."

Dr. Grandville Macgowen (personal communication) says: "Janet's irrigation method of treatment does not abort gonorrhœa. I employ it in a very much modified form in the acute stage."

Dr. Edward Martin (personal communication) says: "I have not found that the method of treatment advocated by Janet for the rapid cure of gonorrhœa is satisfactory. I employ it in acute cases in a modified form with the use of silver salts in conjunction."

If space permitted a great deal more testimony, of a similar character, could be produced, all tending to show that genito-urinary surgeons are becoming skeptical as to the value of the irrigation method of treating gonorrhœa, believing its employment to be unsatisfactory, and in many instances injurious to the patient. On pathological grounds the irrigation method of treatment in the acute stage of the disease has never appealed to us as a rational procedure. A knowledge of the action of the gonococcus and the pathological changes which result from its invasion made it difficult to explain, on a scientific basis, how lavage of the urethra with a medicated solution could affect microörganisms buried beneath the epithelium; moreover, it is not readily understood how overdistention of an acutely inflamed urethra by a large quantity of fluid, injected with considerable force, could be aught but harmful, causing a deeper penetration of the cocci into the subepithelial tissue, tending to extend the virulent inflammatory process and causing an active periurethral cell infiltration, giving rise to chronic urethritis, to say nothing of the tendency to ultimately involve the prostate gland, seminal vesicles, or testicles in the inflammatory process.

When the cocci have once found their way into the subepithelial structures, the question has been raised whether the disease does not, in many instances, become constitutional. In a very interesting article published by Dr. F. R. Sturgis in the *St. Louis Courier of Medicine* for July, 1901, entitled "Should Gonorrhœa be

Considered as a Local or Constitutional Infection?" this subject is exhaustively considered, and it is shown that as a sequence of gonorrhœa the following parts of the body may become affected: the endocardium, the kidney, the brain, the skin, abscesses both of the subcutaneous and intermuscular tissues, the joints, the synovial tendons, the pleura, the eye, the rectum, the mouth, the nose, the pericardium, the liver, the spleen, the veins, the perichondrium, the periosteum, the peripheral nerves, and the spinal cord and the blood.

"Experimentation and investigations have shown that these portions of the system are infected by the gonococcus directly, although in some instances it would appear as if the poisoning was due to a mixed infection, viz., to the presence of the staphylococcus, as well as the gonococcus."

Impressed by the marvelous results said to be obtained by this method of treatment, accounts of which were heralded almost daily in the medical periodicals by its enthusiastic advocates, we decided to give it a fair and impartial trial. Space will not permit a detailed account of these investigations; suffice it to say that the treatment was tried in a large number of cases and resulted in our abandoning it as unsatisfactory and dangerous, and we now have the satisfaction of seeing the trend of professional opinion gradually returning to the stand that we originally held.

If the claim made were verified, that "ninety per cent of cases of acute gonorrhœa can be cured by this means in fourteen days," the Gordian knot in the treatment of this disease would be severed, and the status of this serious complaint in the community to-day would occupy a very different position from that which it now holds.

For the past nine years this mode of treatment has been on trial and has been employed in numberless cases. If the claims made by its advocates were substantiated, we would find at the present time that in the majority of cases the disease would be of a short duration, complications would be of infrequent occurrence, and we would meet with few chronic cases with inflammatory involvement of the deep-seated sexual organs. Is this true? Unfortunately the disease is just as common now as heretofore, runs precisely the same course, and lasts the same length of time; complications are as numerous and as severe as in the past, and cases of obstinate chronic urethritis more frequent, if anything, than hitherto. Whilst much has been learned regarding the cause of gonorrhœa, its pathology, the means of diagnosing the lesions which are keeping up the condition, and in the management of this chronic condition, during the last decade, we are forced to admit that we have made little or no progress in our attempt to abort the disease, control the acute stage, or prevent complications. The statement still holds good that "an individual who convalesces from an attack of specific urethritis, without any complication, in the course of six weeks may consider himself very fortunate."

Woodruff, in an article on gonorrhœa in the *Medical Record* for March, 1901, quotes Vogl, who found in the military hospitals of Munich before 1882 that the average duration of treatment of acute gonorrhœa was forty-five days; when the employment of the silver salts was begun the time required was from forty-five to forty-seven days. After 1896, when the use of silver nitrate, potassium permanganate, and protargol was introduced, the average was forty-two days. Now that the profession is awakened to the fact that when treating specific urethritis they are dealing with virulent inflammation due to a specific germ that rapidly insinuates itself into the subepithelial structures, and therefore cannot be reached by local applications except in the incipiency, it is probable that the next ten years will see a great difference in the methods in vogue for combating this disease. Already the tendency is to use less heroic measures, and to resort to the employment of local remedies only when the subacute or chronic stage is reached. A brief account of our personal experience with this method of treatment will now be presented.

The last yearly report of the Jefferson Medical College Hospital shows that an average of 715 cases of urethritis are treated annually in the out-patient genito-urinary clinic of that institution. The experience and knowledge gained from this large field of observation permit us to feel some confidence as to the accuracy of

statements that we may make on this subject, which is done with due deference to the opposing views held by other specialists.

Results obtained by us from the irrigation treatment of cases of acute blennorrhagia are similar to those of the authorities already quoted as being averse to its employment. In no instance did we succeed in aborting the disease. The average time required to effect a cure varied from four to six weeks. In the majority of cases the length of the acute inflammatory stage was shortened in duration by a few days, and the stage of decline, or "waiting stage," superinduced, which usually subsided into a chronic condition most difficult to eradicate. In many cases the irrigation was attended by pain and discomfort on the part of the patient, and in a few cases slight hemorrhage followed the treatment. Prostatitis, seminal vesiculitis, and epididymitis frequently followed lavage, and in a small number of individuals a severe form of acute posterior urethritis developed shortly after irrigation so that the treatment had to be discontinued; in a majority of the patients other means had necessarily to be resorted to. In some instances individuals refused to permit further treatment after the first irrigation.

Irrigation of the deep urethra, by means of hydrostatic pressure, did not apparently produce any injurious results when the inflammation was of a very mild type. If the condition was more or less acute, the symptoms of frequent micturition, spasm, and pain were increased, and frequently followed by sharp attacks of some inflammatory condition of the deep sexual organs. It is our belief that irrigation of the posterior urethra and bladder by means of pressure should be reserved for those who are accustomed to urethral instrumentation, and should be confined to chronic cases.

The mucoid discharge, associated with a sticky condition of the meatus, which follows so frequently as a sequence to Janet's method of treatment, was observed in the majority of cases in which irrigation was employed. Those who advocate lavage in acute urethritis claim that this secretion is a harmless condition and that the individual is cured notwithstanding its existence. It is singular that in no instance is a report of the examination of the urine made where the gleety discharge persists, although the patients are reported as "cured."

In some instances it was found that the urine was clear but filled with threads, and in many cases it was cloudy, due to mucin in solution. A microscopical examination exhibited epithelial and occasionally a few pus cells, showing that the patients were far from well, and the character of the urine pointing to some chronic lesion or lesions still remaining in the urethra, this state being a prolongation of the "stage of decline" where acute exacerbations are apt to occur on the slightest provocation, or where some inflammatory complications of the sexual organs, connected with the urinary tract, are apt to supervene.

An endoscopic examination of a number of these so-called "cures" revealed congested zones in various portions of the urethra; the mucous membrane at the site of the inflammatory lesion being red and bathed in a hypersecretion of mucus. Associated with these inflammatory areas the canal was thickened and irritable.

Any one with a mind unbiased who will analyze the testimony offered both for and against the irrigation treatment of acute specific urethritis will, it is believed, feel justified in subscribing to the conclusions which follow:

1. The irrigation method of treatment will not abort acute specific urethritis.

2. It will hasten the terminal stage of the disease, which is prolonged and difficult to cure.

3. Chronic urethritis and involvement of the deep sexual organs are common sequences.

4. In many instances, in order to effect a cure in the terminal stage of the disease, the irrigations must be discontinued and other methods of treatment employed.

5. Irrigation should not be employed in the acute stage of specific urethritis.

6. Irrigation of the deep urethra by means of hydrostatic pressure is injurious in the majority of cases of acute gonorrhœa, and is conducive to the development of complications.

7. Little or no progress has been made in the treatment of acute urethritis either in aborting the disease, lessening its duration, or preventing complication.

# The Therapeutic Gazette

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## Leading Articles.

### *THE IMPORTANCE OF THE VASOMOTOR SYSTEM AS A FACTOR IN DISEASE.*

A number of years ago in the columns of the THERAPEUTIC GAZETTE the writer of this editorial endeavored to emphasize the importance of considering the vasomotor system as a factor in disease, and expressed the opinion that in many instances of supposed cardiac failure the heart was in reality not at fault, but the circulatory symptoms were entirely dependent upon relaxation of the blood-vessels and consequent stasis of the blood in the capillaries, with the result that the patient was practically bled to death in his own blood-vessels, so that his heart failed, not because of any innate weakness but because it could not get enough blood to pump it into the systemic vessels in general and the coronary arteries in particular. Since that time we have again and again reiterated our belief in regard to the importance of studying the arterial pressure and tension of the blood-vessels in all cases of illness, acute or chronic, where the circulation seemed to be failing, and in the report made to the government of Hyderabad, India, in 1893, the writer insisted that an intact vasomotor system was as important a factor in the maintenance of life as an intact cardiac mechanism.

Increasing experience, both clinical and experimental, has only served to increase our confidence in the correctness of this view, and has stimulated us again and again to the importance of impressing upon students of medicine the necessity of determining arterial tension in all cases. Within the last few years very notable additions to our knowledge concerning the vasomotor system in clinical surgery have been made by Dr. Crile, of Cleveland, whose experiments have done much to support views originally expressed by Dr. Horatio C. Wood, and still further amplified by ourselves. Crile has found that the restoration of what may be called approximately the normal blood-pressure, by the administration of adrenalin, also restores the activities of the heart muscle, and enables this viscus to continue beating even after an animal has been decapitated, artificial respiration being maintained simultaneously. In surgical shock much can be done toward the preservation of life by the restoration of a normal arterial tension, and while strychnine, digitalis, and alcohol stimulate the heart chiefly, the real need is to stimulate the vasomotor system, and to provide support for the blood-vessels in the extremities so that the circulation may be carried out satisfactorily in vital portions of the body. Crile's experiments may be considered to be amplifications of the views already quoted, and particularly those of Leonard Hill of London, who showed, it will be remembered, that pressure upon the great abdominal vessels was a most valuable measure for the maintenance of arterial tension in shock.

It is not many months since we urged in the editorial columns of the GAZETTE that when adrenalin is administered as a vasomotor stimulant it should be given often and in minute dose, since by so doing we approximate the method by which nature provides the system with the materials derived from the suprarenal glands in health. We are therefore inter-

ested to note that as a result of Crile's experiments he recommends that adrenalin be given in so dilute solution as 1 to 100,000, and that it be administered by means of a burette, so causing long continuance of the injection. This is still further necessary because adrenalin is quickly oxidized by the blood, and is comparatively fleeting in its influence if one single dose is given.

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### *THE INTRAVENOUS INJECTION OF GERMICIDES IN SEPTICEMIA.*

Some of our readers may have observed reports in the daily journals of one or more cases of septicemia in which a cure apparently followed the injection into the blood of solutions of formaldehyde in strengths varying from 1 to 250,000 to 1 to 50,000. Since these reports in the daily journals have appeared, an article has been published in the *New York Medical Journal* of January 31, 1903, by Dr. Barrows, in which he records the case of a negress of twenty-six years who suffered from streptococcus infection, and from whose blood this microorganism was obtained in pure culture. This patient received a pint of 1-to-5000 aqueous solution of formaldehyde. Good results immediately followed, and ultimate recovery took place, at least to the extent that at the time of the report the patient was up and about the ward. This experiment of Barrows is not of course entirely new. Other investigators have from time to time attempted to combat blood poisoning by the intravenous injection of antiseptics and germicides. But in almost every instance the injection has not been a success, and the method has been discarded, the reason being that the material which was qualified to destroy the protoplasm of the invading microörganism was also qualified to destroy the living cells in the blood stream or to act upon the cells of the blood-vessels or the tissues surrounding them in a deleterious manner.

We confess to having some skepticism as to the value of this use of formaldehyde. It is true that Ewing has made experiments in which large quantities of formaldehyde were injected into the blood-vessels of rabbits without untoward results, either upon the general system or upon the blood cells, and that as long ago as 1900 Maguire reported in the London *Lancet* the results of experiments which he made upon himself, showing that such injections were apparently harmless in moderate quantity. Thus, he injected as much as 100 cubic centimeters of a 1-to-2000 solution into the vein of his arm, and shortly afterward detected evidence of aldehyde in his urine; and again, on another occasion, an even larger quantity, with the result that he produced, first albuminuria, and then hematuria. Maguire thought that 1-to-200,000 of formaldehyde solution would act as an efficient germicide.

In these days of wonderful scientific discovery it is not safe to condemn any therapeutic procedure on purely theoretical grounds, and therefore we look forward with interest to further experimentation along this line, although we cannot help feeling that it is not founded as yet upon accurate scientific observation. It must be remembered that on the one hand under ordinary circumstances the blood possesses extraordinary power to destroy microörganisms, and that it is only when prolonged disease has exhausted this power that microörganisms can exist in it with impunity. Again, it seems scarcely credible that formaldehyde can restore the bacteriolytic power of the blood, nor can we believe that an agent which is powerful enough to destroy the streptococcus can circulate in the blood without doing any damage to the endothelial cells lining the blood-vessels, and the blood cells themselves. The fact that Maguire's observations of over two years ago have not been followed by the general application of this method to the treatment of septicemic attacks seems to us to prove that the profession in general has had a well grounded timidity in regard to the employment of so radical a therapeutic measure. An item on this subject will be found in our Progress columns in this issue.

Since this editorial note was written we have read with much interest an interesting series of experiments reported to the *St. Louis Medical Review* of January 31, 1903, by Dr. Snodgrass and Dr. Elbrecht. These investigators, recognizing the importance of this subject, no sooner heard of the experiments which had been made in New York than they

promptly undertook a series in St. Louis. Their methods of research seem to have been accurately and carefully carried out. Using rabbits for the purpose of inoculation with the streptococcus, they injected formalin solutions in a quantity proportionate to that employed in New York for the woman who suffered from puerperal septicemia. It is a noteworthy fact that cultures from the heart's blood of all the rabbits gave pure cultures of streptococci, even when injections of formalin were used. They state that from their results they do not feel justified in drawing conclusions which would recommend or condemn the formalin treatment of septicemia, and they also conclude that formalin is slow to act because it requires over an hour for a 1-to-500 solution to kill the organisms, whereas 1 to 1000 required over four hours, and therefore the direct action of formalin in its dilute solutions must be extremely mild. The formalin which they employed was evidently excellent, as it was tested by the Professor of Chemistry in the Washington University and found to be of a strength of 38.98 per cent. They also state that since their experiments they have heard of two cases in St. Louis in which this method of treatment was carried out. One of these received the injection, and although the temperature and pulse were reduced, the patient died. The other patient was stated at last reports to be improving. It is an interesting fact that as the days go by more and more articles expressing disapproval of this plan of treatment are appearing, and it is probable that in a short time nothing more will be heard of it. Barrows's recommendation as to the method of treatment is summed up in his own words as follows: "Inject into the median basilic vein 500 cubic centimeters of a 1-to-5000 of formalin solution in water at the temperature of 60° to 70° Fahrenheit"—a temperature far too low for intravenous injection.

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### *THE ADVANCEMENT OF RATIONAL THERAPEUTICS.*

It has been said, by those who have failed to give the subject of therapeutics adequate study, that this department of medical learning is far behind other branches in the art, and that a large part of it is based upon pure empiricism and the idea that because a remedy has proved useful in one case it must needs prove useful in another. To those who have given this subject adequate attention it is evident that therapeutics is in many respects the equal of other up-to-date departments of medical science, and in some respects is far ahead of them. Each month as it goes by does more and more toward showing that many methods based on empiricism have in reality a firm foundation in scientific research. In most instances in which empiricism rules the fault lies not in therapeutics, but in the crude state of physiology, pathology, and bacteriology, which so far have failed to reveal to us the cause of certain diseases, and thereby prevented us from explaining how remedies act advantageously in combating their progress. Twenty years ago the use of quinine was purely empirical, but now has become absolutely scientific and rational. On the other hand, it is a well known fact that the salicylates are of great value in rheumatism, but as yet we cannot employ them rationally because we do not know the cause of the disease, and therefore cannot explain how they produce relief.

A large number of instances of this sort might be adduced, but the object of this editorial is to call attention to the fact that recent studies upon immunity clearly indicate that some of our remedies will be found in future to produce their good results by aiding the system in combating infection, not by any direct stimulant effect upon the vital functions of circulation, respiration, and bodily heat, but by their ability to increase the power of the organism to destroy bacteria, or their toxins, or to render the body immune to their effects. In this connection it is interesting to note that the so-called "old-fashioned idea" that nursing babies are more likely to escape infection than those who are bottle-fed is based upon actual fact, which has been discovered by experimental investigation. Several years ago it was pointed out by Ehrlich that a guinea-pig or rabbit may acquire through the milk which it sucks from its mother the immunity to certain diseases which had been artificially produced in the parent by the laboratory investigator, and so great may this immunity be that the young can stand the inoculation of virulent material

which under ordinary circumstances would produce death with great rapidity. So, too, in his Huxley lecture on immunity delivered in London last fall, Professor Welch, of the Johns Hopkins University, pointed out that during early infancy the mother has the power of conferring upon her offspring, through her milk, immunity to certain diseases which she herself has acquired by having suffered from them, and he also pointed out that research had shown a relative richness of the suckling's blood in protective antitoxins which does not exist in the blood of infants when not so nourished.

In the next editorial in this issue a similar illustration of how scientific investigation places therapeutics upon a scientific foundation is given.

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### *THE FAR-REACHING INFLUENCE OF PROPER FEEDING IN TYPHOID FEVER.*

Readers of the THERAPEUTIC GAZETTE are well aware of the fact that during the last five or six years we have frequently in our editorial columns insisted upon the need of supplying patients during an attack of typhoid fever with other diet than one of pure milk, and that while on the one hand we have advocated a greater number of nutritious articles than are commonly given to such patients, on the other we have not gone so far as to recommend a too liberal diet. It has been our experience that the administration of other soft and easily digested foods than milk carries the patient through his illness and leaves him on the shores of convalescence less wasted than does a pure milk diet, and so we are particularly interested in the results of a most interesting research recently carried out in England and published in the *Lancet* of December 6, 1902, by Professor Wright and Lieutenant Knapp of the Army Medical School at Netley upon the causation and treatment of thrombosis occurring in connection with typhoid fever. Many persons would suppose that it was a far cry from the diet in typhoid to the occurrence of venous thrombosis, yet these investigators have shown, on the contrary, that these two factors in the case are very intimately associated, for they have proved that one of the reasons why thrombosis is so frequently seen in typhoid fever depends upon the fact that the quantity of lime salts in the blood of typhoid convalescents is greatly in excess of that in normal blood, and that this results in increased coagulability during convalescence. They also believe that this excess of lime salts must be obtained from the milk, which constitutes in many instances an exclusive article of diet, and they point out that cow's milk is particularly rich in calcium oxide, it being present in cow's milk in the proportion of 1 to 600 as compared to 1 in 800 in lime water. They recommend, therefore, that where there is a tendency to thrombosis after an exclusive milk diet, partial decalcification may be effected by adding to the cow's milk from 20 to 40 grains to the pint of the citrate of soda.

In conclusion it is interesting to note that they believe that this is one of the reasons why a milk diet is so beneficial in certain cases of albuminuria or "serous hemorrhage from the kidney," and explains the comparative rarity of thrombosis after acute fevers such as Malta fever, in which disease a milk diet is insisted upon. Such researches as these are of great scientific interest and practical value, and we earnestly trust that Professor Wright, who has already made such valuable contributions to the pathology of the blood and its bearing upon therapeutics, will find opportunity for a continuation of his useful investigations.

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### *ANESTHESIA AND "BAD SUBJECTS."*

In our experience it is a fact that physicians are apt to be too fearless in the administration of ether and chloroform to healthy persons, and too fearful in its use in those who are suffering from valvular diseases of the heart. In the majority of instances of the latter condition, even when dilatation exists, it is usually the case, when the anesthetic is administered carefully, particularly if it be ether, that the condition of the patient after he is fully under the influence of the drug is better than it was immediately before its administration, and we are quite confident, as we have often stated on previous occasions in these columns, that the danger of cardiac failure in an operation which is imperatively demanded is much

less in a case of heart disease when an anesthetic is employed than when local anesthesia or no anesthesia at all is used.

We are therefore not a little interested in the statement made by Mr. Frederick Hewitt in the *Lancet* of January 17, 1903, in which it is evident that he agrees with this view, stating that patients suffering from *morbus cordis* are not bad subjects for anesthetics provided the methods employed are suitable and all asphyxic strain upon the heart is avoided. For this reason he thinks that nitrous oxide is disadvantageous, but that ether or chloroform is useful. In this connection, too, it is interesting to note that nitrous oxide, in his opinion, should not be given to a patient with angina Ludovici, and that ether is a dangerous anesthetic in cases where the trachea is pressed upon by a large thyroid. In both of these instances he thinks that chloroform is better because its use is not followed by pharyngeal and laryngeal spasm. For this reason he is certain that for a goitre chloroform is the only permissible anesthetic, and further thinks that in bad cases of empyema, ether and oxygen combined form the best method of producing anesthesia. With all of these views we can heartily concur.

The question of the safety of these drugs in the treatment of alcoholic patients is also one of very considerable interest. It is very well recognized that those who are addicted to the use of stimulants usually require very large amounts of ether or chloroform, not infrequently take it badly, and are quite apt to have disagreeable symptoms during the progress of the operation, such as stormy respiration, irregular action of the heart, and muscular spasm. Here, too, it is evident that the experience of English anesthetists agrees entirely with those of this country, and Hewitt thinks that the excessive use of tobacco, without alcohol, frequently results in producing a condition which causes the anesthetist great inconvenience during the progress of his task. The difficulty apparently increases not infrequently with the quantity of tobacco which has been used shortly before the operative procedure. It is also not to be forgotten that not infrequently the patient will present not one but several of these conditions, which render anesthesia more difficult. Thus, there may be nasal obstruction and the tobacco and alcohol habit combined in one case. As Hewitt points out, powerfully built young men, who have drunk very freely, may require enormous quantities of anesthetics, ether being almost useless in these cases because it is so difficult to get the patient under its influence; and in summing up his article he points out that the worst type of all for the administration of an anesthetic is a stout, breathless old man, who has smoked and drunk to excess, and has for years suffered with nasal polypi. He thinks that the best posture for such a patient is the lateral position, since in this attitude the ejection of the contents of the stomach is comparatively free from risk.

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### *SURGICAL TREATMENT OF HEMORRHAGIC PACHYMENINGITIS.*

Though the pathology of hemorrhagic pachymeningitis has been extensively studied, and though the disease is a very common one, it has been but lately subjected to surgical procedure. It has been noted in infants, in the insane, and usually occurs in middle adult life as a sequel to trauma, or in those who are alcoholic, syphilitic, or who have been subjected to wasting or exhausting diseases.

The symptoms are not such as to present a particularly clear clinical picture. They usually begin with signs of irritation, at first unilateral, later bilateral, but unequal, and are often followed by symptoms of pressure. The later appearance of paralysis and the repetition of and multiplicity of attacks, together with a preponderance of the symptoms of irritation, are regarded as the most important diagnostic signs. Early stiffness or rigidity of one or all limbs is considered a symptom of peculiar value. The cranial nerves are not likely to be affected.

Monro (*Boston City Hospital Reports*, 1902), who states that the subdural hemorrhage is characterized by the slow development of mental irritation, spasm, rigidity of the extremities, convulsions, and paralysis, the sequences being more or less regular, believes that the surgical treatment is imperative and that it should be instituted as early in the disease as possible, since without operative relief in cases with pressure symptoms the prognosis is practically hopeless. Monro re-

ports one case, a patient of sixty-two, alcoholic, who was picked up on the street by the police. He was able to talk when taken to the station house. Shortly afterward he became unconscious and could not be roused. The right pupil was dilated, but both pupils reacted to light. The temperature was normal, the pulse 80. The right knee-jerk was absent. There was no rigidity. Hematoma was present in the right parietal region. The dura was bulged and dark-blue. Beneath it was found much serum and several ounces of blood-clot adherent to the dura and covering the entire hemisphere. It was washed out after being broken up with the finger, allowing the brain to expand and pulsate. The trephine was then applied to the left side, and a diffuse, thin layer of blood-clot was found and washed out. The patient gained consciousness and talked intelligently. Ten days after operation the mental condition was good.

The second case was somewhat more characteristic. It was that of a syphilitic, thirty-four years old. Two months before being seen he gave a history of having been unconscious for a few minutes. Two days before he entered the hospital he complained of pain across his forehead, and during the night suffered from severe headache and numbness on one side; shortly afterward he became unconscious, with violent twitchings of the arms. On admission to the hospital he was unconscious, with equally dilated reacting pupils, exaggerated knee-jerks, and normal sense of pain. He could be aroused, could answer intelligently to some extent, and could recognize a pin-prick, but would mistake the side. The left-hand grasp was weak. He could move all the extremities, but when irritated invariably moved the right arm. The next day his unconsciousness was more pronounced. The temperature rose. The left pupil was slightly dilated. At operation he was comatose, with pulse and temperature rising. Beneath the left dura were recent blood-clots, one-eighth to one-half inch in thickness; they were more abundant on the frontal side than on the occipital. This patient died six hours later without recovering consciousness. Three other patients subjected to operation also perished. None the less Monro's contention as to the hopelessness of these cases without operation is correct. Though the mortality of hemorrhagic meningitis because of its associatied lesions is high, it cannot but be bettered by a trephining, which even though exploratory—and this must necessarily be in many cases because of the irregularity of the symptoms—none the less relieves intradural pressure.

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### *THE PHLORIDZIN TEST.*

Of the methods which have been brought before the profession in recent years as a means of determining the degree or extent of renal degeneration or the adequacy of the organs for the purposes of elimination, the so-called phloridzin test has perhaps received the most attention, as being fairly simple in its application, and as promising to be distinctly helpful to the surgeon in deciding for or against the performance of operations not absolutely essential to the immediate preservation of life.

Cryoscopy, by which is meant a study of the freezing point of the urine and blood of those supposed to be suffering from renal insufficiency, is a somewhat elaborate procedure, requiring for its performance a quantity of blood greater than can be obtained by any method other than a minor surgical operation. The methyl-blue test is undoubtedly of service, but is not so simple as it would seem, since the estimation of the quantity of methyl-blue eliminated cannot be determined by a color reaction alone, but requires a chemical estimation of the amount of the drug in the urine.

As opposed to these the technique of the phloridzin test is simple. The drug is given hypodermically with an equal quantity of sodium carbonate, this being required to hold the phloridzin in solution. Five milligrammes is the ordinary dose, but twice this quantity should be given to large people. Immediately before injection the bladder is emptied. When the kidneys are healthy there should be an elimination of sugar in half an hour. If none can be found at the expiration of this time, serious disease of the kidneys may be suspected, whilst if but a small quantity can be detected renal insufficiency may be diagnosed.

The standard of the quantity which de-

notes health and disease is an arbitrary one. A study of this subject by Watson and Bailey (*Boston City Hospital Reports*, 1902) led them to adopt a standard midway between the average percentage of the cases in which the kidneys were believed to be normal and the same of those in which renal disease was known to be present. This they found to be .3 per cent. All percentages of sugar falling below this number were taken as indicative of renal insufficiency in proportion to the degree in which they were less.

It is believed that the separation of sugar from phloridzin takes place in the epithelial structure of the glomeruli and tubules of the renal cortex, and in no other part of the body. It seems to be well established that the drug is entirely harmless.

It is because of the special action of the epithelium upon the phloridzin that the test is superior to methyl blue, since the latter shows only the permeability of the membranes interposed between the blood and the urine in the renal parenchyma, whilst the former is dependent not only upon this factor but upon the integrity of the renal epithelium.

The phloridzin test was first applied to determine whether or not ether, which is known to produce slight albuminuria or the appearance of casts, also seriously interferes with the permeability of the kidneys. It was noted that when the kidneys were previously healthy ether actively stimulated the functional activity, and when the kidneys were diseased this stimulating effect was not observed, and that there was relatively much less sugar eliminated in the first than in the second half-hour after phloridzin had been given than was the case when the kidneys were sound. It was also noted that the average percentage of sugar in the first half-hour after the administration of the drug subcutaneously was .45 per cent when the kidneys were normal, and that the first half-hour's elimination was greater than the second by .06 per cent. When the kidneys were diseased the first half-hour's quantity of sugar eliminated was about half as much as that when the kidneys were normal, and there was but little more in the first half-hour than in the second half-hour.

In considering the practical value of the phloridzin test the authors state that in a certain number of individual cases it appears to be more delicate and discriminating than the ordinary urinary tests, but the relatively large number of instances in which the reverse of this is true shows it to be too variable to be trustworthy. Hence the authors are not inclined to urge its adoption in preference to the former methods of urinary analysis unless for estimating functional capacity of the kidneys. This test, however, is distinctly helpful when taken in connection with the information gained by the ordinary tests, and its value should be carefully weighed before undertaking formidable operations, particularly those upon the genito-urinary tract.

## Reports on Therapeutic Progress

### *THE TREATMENT OF CARDIAC FAILURE IN TYPHOID FEVER.*

ROLLESTON states in *Treatment* for October, 1902, that in the treatment of cardiac failure we are to recall the fact that the prevention of this mishap is one of the most important points in the treatment of the disease, for more patients die with gradually increasing asthenia, in which the heart muscle plays a very prominent rôle, than from the more striking and special complications — perforation and hemorrhage.

Of the cardiac stimulants, the most commonly used, and the one which probably retains the most wide-spread confidence, is alcohol in some form or another, such as brandy, whiskey, champagne.

At one time the author regarded alcohol as *the* remedy for failing heart in typhoid fever, and considered that it should be given with no niggardly hand in bad cases; but gradually, partly from observation of cases, and partly from the experience of others, especially from consideration of the facts insisted upon by Dr. Graham Steell—that cardiac dilatation is frequently in the otherwise healthy due to alcoholic excess—he has come to distrust the value of alcohol in large quantities in typhoid fever. In this disease the myocardium is already suffering from the toxic action of one poison, and would therefore be more likely to suffer from the

effects of alcohol. Alcohol does temporary good by stimulating the neuromuscular mechanism of the heart, but there is danger that it may do more lasting harm to the myocardium. If alcohol were only required to get over one critical period, it would not be so likely to be harmful, but since the failing condition of the heart often requires rather prolonged help, there is some risk of doing harm as well as good.

Ether and ammonia are probably much less prone to damage the cardiac muscle, but are not very welcome drinks to a patient with fever.

In alcoholic patients it might naturally be assumed that alcohol would necessarily be required during the course of typhoid fever. No such rule can be maintained. It is surprising sometimes to see how well an alcoholic patient may do in typhoid fever without any of his accustomed stimulant.

There is a theoretical, and possibly somewhat remote, consideration which makes one loath to give alcohol during typhoid, or, indeed, in any other infectious fever, unless it is absolutely necessary. It is the possible danger of setting up cirrhosis of the liver. During typhoid fever changes which are temporary in nature and consist in focal necrosis of the liver cells are not uncommon. It is quite conceivable that alcohol, if taken in excess, might interfere with recovery of the liver, and lead to permanent changes in that organ of the nature of cirrhosis. While bearing this in mind, and also the possibility that post-typhoidal neuritis may in some instances be partly due to alcohol taken during the fever, few would abstain from giving alcohol if it was thought to be demanded by the gravity of the patient's condition.

Without taking up an extreme position, the author is inclined to minimize the amount of alcohol given to counteract cardiac debility and rely on other means, and chiefly on the hypodermic injection of strychnine. It is not uninteresting to recall the origin of this method of stimulating a failing heart. It is now in very general use; so much so, that a nurse has been known to surreptitiously supplement what she regarded as the doctor's inadequate treatment, producing convulsions. It was first brought before the profession by Dr. S. H. Habershon in 1886 as the result of observations made when house physician at St. Bartholomew's Hospital. He advocated it for cases where the heart is prone to fail in the course of some acute illness. He did not in this paper quote any cases of typhoid fever, the seven cases referred to being two of double pneumonia, and five of valvular disease of the heart.

It is curious how soon and how often we forget the originator or discoverer of valuable methods of treatment or of new diseases, unless some dutiful friend or former pupil renders this impossible by labeling the articles "Tufnell's treatment" or "Hodgkin's disease." To take as an example a drug most of us have at the tips of our tongues every working day, iodide of potassium, how many of us can even recall the benefactor's name?

It is important that the strychnine should be given hypodermically and not by the mouth, and this for two reasons: first, its action is much more rapid when given under the skin (in cases of typhoid fever with cardiac weakness absorption may be very considerably delayed); and secondly, because the liver has a detoxicating influence on, or interferes with the action of, poisons that reach it. When injected under the skin, strychnine acts both more rapidly and more effectually than when given in the ordinary way by the mouth.

Strychnine may be given in the form of the ordinary liquor of the British Pharmacopœia in doses of 2 to 5 minims twice, or more often if required, during the twenty-four hours, or it may be given in a special solution of 1 grain in 50 minims.

The heart should, of course, always be carefully watched during the course of the fever, so that, as soon as dilatation commences, as shown by an accentuated pulmonary second sound in association with alteration of the first sound and displacement outward of the apex-beat, the hypodermic injection of strychnine should be started. For its success it should be employed early, and not called in only where cardiac dilatation is well marked.

Strychnine thus given is far superior to digitalis and strophanthus by the mouth. The author has had no real experience with digitalin hypodermically. When he

has employed this preparation it has been in combination with strychnine.

Stengel has indorsed the well known use of subcutaneous injections of 1 to 2 grains of camphor dissolved in 15 minims of sterilized olive oil as a cardiac stimulant in typhoid fever. Hypodermic injections of sulphate of sparteine, the alkaloid of broom, have been spoken of favorably for cardiac failure in children by Calamet.

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### *BRONCHITIS AND BRONCHOPNEUMONIA IN CHILDREN.*

MITCHELL states in the *Archives of Pediatrics* for November, 1902, that in these states from the very first careful feeding is of great importance, since the course of the illness is apt to be protracted. In many cases, especially in infants, this is the most trying part of the treatment, vomiting and diarrhea being frequent accompaniments and the digestive powers greatly enfeebled. On this account great care should be exercised in the administration of medicines so as not to still further derange digestion and interfere with nutrition. For the control of cough, inhalations are often more efficient than medicines. Simple steam is soothing and assists in loosening the expectoration. Creosote, turpentine, benzoin, etc., may be added. Only where a harsh, dry cough is exhausting the strength should opiates be given, and then in small doses, only sufficient to relieve the severity of the cough. Syrup of ipecac in doses short of nauseating is the author's favorite expectorant during the dry stage, and later the solution of anisate of ammonia.

In cases which become subacute or chronic the creosote preparations are of great value. The writer has usually used carbonate of guaiacol, which does not readily disarrange the stomach. Where dyspnea and cyanosis are severe oxygen is of great service. In several cases in quite young children in the writer's experience, it has apparently been the means of saving life.

Strychnine is often invaluable as a heart stimulant. For heart failure it is often given with success in large dosage, but it should be remembered that its action is that of a powerful stimulant to the nerve centers, and that stimulation too long continued results in paralysis. Large doses therefore should be reserved for the emergencies and should not be too long continued.

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### *TYPHOID FEVER AND ANTITYPHOID SERUM.*

Following quickly upon the results so successfully accomplished by Chantemesse and Widal, Pfeiffer, Loeffler and Abel, and many others in immunizing laboratory animals against experimental typhoid, it was but natural that great hopes should be entertained as to what might be accomplished along this line in treating the disease in man. That the success so readily demonstrated in the experimental field has not been so triumphantly achieved in controlling the course of typhoid as we see it clinically does not in the slightest degree militate against the rationale of this method of treatment, and happily has not in any way discouraged those to whom we owe the solution of this as of many similar and even more difficult enigmas in medical science.

That in certain instances an antityphoid serum has been used with apparently marked benefit we know from the small number of observations which have been recorded, and any additional evidence of the efficacy of the use of such a serum must inspire one with a sense of great encouragement.

As far back as 1895, Klemperer and Levy reported five cases of typhoid fever in which treatment with antityphoid serum was begun, in every instance in the first week of the disease. Following immediately the administration of the serum the general condition improved, and each case went through what would be considered a mild course of typhoid fever, the temperature being normal for the first time during the third week. In one case, as these observers frankly admit, there was a slight recrudescence eight days after the temperature had become normal. From the meager evidence of these five cases they did not feel justified in attributing too much to the administration of the serum, though it was apparently true that its use rendered the course of the disease mild, and shortened its length somewhat.

In four cases of typhoid fever treated by the administration of an antityphoid serum reported by Pope, treatment was begun in two cases on the fifteenth day of

the disease, and in the other two cases on the twelfth and thirteenth days respectively. In two instances a steady though gradual defervescence took place following the first administration of the serum, and in all four the general condition of the patients seemed to improve markedly from the commencement of the treatment; and Pope concludes that the use of the serum had at least a beneficial effect upon the course of the disease.

More recently, in a very interesting article, Stokes and Fulton report five additional cases of typhoid fever treated with a curative serum which protected guinea-pigs against twice the fatal dose of dead typhoid bacilli.

In case No. 1 treatment was begun on the thirteenth day, the temperature reaching normal on the twenty-eighth day of the disease; the case ran a mild course. In case No. 2 treatment was begun on the ninth day, the temperature reaching normal on the twenty-second day. On the twenty-seventh day a relapse occurred, which lasted ten days. This case also ran a mild course. According to these writers it cannot be said that the doses of serum given had any appreciable effect upon the temperature, pulse, or other symptoms in these two cases. In case No. 3 the temperature at the outset ranged between 103° and 104°. On the fifth day after admission to the hospital the serum treatment was begun; 200 cubic centimeters in all was used, 40 cubic centimeters being given in two injections daily. The temperature began to decline steadily following the first injection, and reached normal on the seventeenth day. Case No. 4 ran a similar course, the temperature reaching normal on the fourteenth day, but 64 cubic centimeters of serum having been given; and in case No. 5, in which the temperature at the outset ranged between 103° and 106½°, the administration of the serum in doses of 10 cubic centimeters daily was quickly followed by a fall in the temperature and uninterrupted recovery and a rapid convalescence.

As these observers admit, the number of cases treated is far too small to allow of accurate conclusions as to whether the use of a serum of high immunizing strength is, in itself, of any benefit in typhoid fever. If, however, we weigh the evidence at hand and consider the necessarily slow stages by which any real advance has been made in the clinical application of truths, often so easily demonstrated in the laboratory, there is, we venture to assert, real ground for the hope that the future has in store the solution of this as of many other equally difficult problems, and that at some not too distant time the mortality rate of typhoid is to be considerably reduced below even the present figures.—*Cleveland Medical Gazette*, November, 1902.

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### *THE TREATMENT OF DIPHTHERIA BY INTRAVENOUS ADMINISTRATION OF ANTIDIPHTHERITIC SERUM.*

In the London *Lancet* of December 20, 1902, CAIRNS, of Glasgow, reports the results which he has obtained by the intravenous injection of antidiphtheritic serum in cases of diphtheria. Altogether twenty patients received this treatment, and he believes, as the result of his observations, that where the infection is at all advanced or malignant, such a method of administering the antitoxin is highly desirable. He is also convinced that very much larger doses of antidiphtheritic serum should be employed than those which are often used. Thus, he states that his subcutaneous doses varied from 4000 to 20,000 units, and intravenously from 20,000 to 35,000 units. He also adds that despite these large quantities of serum, no untoward results of the use of the serum developed. He summarizes his conclusions in the following manner, as to when intravenous injections are needed:

(1) In malignant forms of the disease —*i.e.*, those characterized by hemorrhage from the nose or into the skin, by great glandular enlargement with marked cellular infiltration, and by extreme blanching of the skin; (2) when there is any marked involvement of the lungs, either at the time of admission or subsequently; (3) when there is a moribund condition of the patient on admission; and (4) when profoundly toxemic conditions of the patient are present. In all such cases an initial dose of from 20,000 to 25,000 units is perhaps not excessive, and if in twenty-four hours the patient fails to respond to the treatment, as indicated by persistence of the signs of toxemia, by

continued rise of temperature and increased frequency of pulse and respiration rate, and by an extension of the membrane, the dose may be safely repeated. From a consideration of the cases already detailed it may be readily inferred that antitoxic serum when given intravenously in comparatively large doses is a remedy which will yield highly successful results even in those cases which appear from the first to be quite hopeless. He used the serum of Parke, Davis & Co.

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*THE TREATMENT OF HEMOPTYSIS.*

Being particularly struck by the immediate effect of subcutaneous injection of gelatin in a case of hemoptysis in phthisis after all other means had failed, O. NEIDNER (*Deut. med. Woch.*, June 5, 1902) observed the action exactly, and noticed that the solution was but slowly absorbed, and that the movements of the affected side of the chest were practically stopped by the tense swelling caused by the fluid. It therefore occurred to him that the effect might be greatly due to the limitation of movement of the bleeding organ. He considers that if one attempts to carry out a mechanical treatment, one must employ a method which is (*a*) easily and quickly applied to the chest without disturbing the patient much; (*b*) which does not press too much at any given place, but (*c*) is capable of fixing the affected part; and (*d*) which can be worn for days or weeks. He had an opportunity of applying this method to six cases of severe hemoptysis which came into the hospital on account of the bleeding. For this purpose he used strips of "Helfenberg" rubber plaster, cut into widths of 3 centimeters (¾ inch) and in lengths of 60 centimeters (about 2 feet). Twelve of these strips were used for each strapping. In five of the cases the effect was both rapid and complete, and in the sixth it appears that it would have worked satisfactorily had the external conditions been more favorable. The patient was a female, aged twenty-four years, and was admitted for pain, giddiness, sweating, and hemoptysis, which latter continued in spite of the usual remedies being applied, including internal administration of gelatin. Neidner thereupon strapped the right side of the chest (this was the affected side), and the hemorrhage ceased to a great extent. The strapping became loose, and the patient employed her spare time in playfully pulling the corners of the strips. On the following day he applied a fresh strapping, and prescribed agaricin for the night sweats, and the sputum became less colored and less plentiful. The patient then became daring, and as soon as she noticed she was not watched she sat up to write letters, etc., in spite of repeated warnings. There was no actual hemorrhage, but the patient left the hospital too soon after to admit of any definite conclusions being formed.

Neidner considers that his good results justify him in asking others to try this method, and when a larger number of cases have been so treated the value of the method will be clearly shown.—*British Medical Journal*, Nov. 1, 1902.

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*THE SUBCUTANEOUS USE OF FORMALDEHYDE SOLUTIONS.*

Discussing the treatment of bacteriemia by injections of a solution of formaldehyde into the blood the *Medical Record* of January 31, 1903, expresses the following conservative views:

The recent announcement of the successful use of a weak formalin solution injected subcutaneously in a case of severe puerperal sepsis, followed by reports of other cases not so successful, has attracted much attention both in the profession and out of it. We have known for some time that formaldehyde is an antiseptic of great power, and it has been used more or less successfully in a variety of conditions, but the consensus of opinion seems to have been that, while it is extremely active, it is too irritating to be used in any degree of strength in contact with delicate tissues. The report from careful observers in New York that they had used considerable quantities of a 1:5000 solution subcutaneously, or intravenously, with what seemed to them good results, and certainly without causing any immediate apparent damage to the blood, gave rise to much interest in the profession and to some excitement in the daily press. However, the observers themselves will undoubtedly readily admit that one or two cases prove practically nothing, and

those of us who have read the reports will be very loath to admit that any startling advance has been made.

The first case reported was evidently in a very bad way from uterine streptococcus infection, with a temperature of 108°, and after the formalin injection there was a rapid fall in both temperature and pulse, followed by several performances of the same kind, a second injection of formalin meanwhile having been given. The argument of the observer was *post hoc propter hoc* as regards the injection, but it seems to us entirely too early to draw any justifiable conclusions in favor of the efficacy of the treatment, in spite of the fact that the bacteriological condition of the patient's blood improved rapidly. The violent extremes of temperature which this patient exhibited are not uncommon in severe cases of sepsis, and occur without treatment, or after the subcutaneous use of salt solution and other forms of treatment; and we must remember that the uterus in this patient had only very recently been cleared thoroughly of its septic contents when the formalin was used, so that any good effect from this intravenous treatment might also have been expected to manifest itself about the time when the amelioration of symptoms began.

The other cases reported are still too incomplete to discuss fairly, but we may note that in one an injection of only 100 cubic centimeters of a solution of formalin made by mistake 1:2500 instead of 1:5000 caused very serious collapse with cyanosis, symptoms which we are constrained to consider due to a poisonous action upon the red blood-cells. If we are justified in this belief the margin of safety is evidently very narrow, and the need of extreme caution is very clear. The announcement in the lay press of a new procedure in medicine or surgery is always followed by much discussion, and often by a good deal of perhaps injudicious experimentation, into which medical men are sometimes practically driven in their relations with the enthusiastic layman. It is, therefore, wise to emphasize the importance of an accumulation of evidence, and to await the results of more cases. We know so far that considerable quantities of formalin can be injected into the human circulation with reasonable safety, and in one or two instances the injection seems to have been followed by benefit; but we are not in the possession of a real cure for septicemia, and shall not be until we get a true antitoxin and not a mere germicide.

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*THE TREATMENT OF PRURITUS.*

LEREDDE contributes to the *Journal des Praticiens* of November 22, 1902, a useful clinical paper upon this subject. He points out first that it is important to consider the hygiene of the skin as to its circulation, its surface moisture, its dryness, and its oiliness, and states that the two classes of agents which are useful for the treatment of this condition may be considered as chemical and physical. Amongst the first class he finds the anesthetic agents. Some of these are not possessed of marked anesthetic power, and yet relieve the itching. Thus, acetic acid may be employed in the form of a lotion or as a vinegar bath in the proportion of a quart of vinegar to a bath of 250 quarts of water. In Germany he states that the following ointment is employed:

Acetic acid, 20 grains;
Lanolin, 1 drachm;
Vaselin, 3 drachms.

Or, in other instances, a paste:

Acetic acid, 20 grains;
Vaselin, 2 drachms;
Lanolin, 3 drachms;
Starch, 3 drachms.

Carbolic acid may be employed in one- to three-per-cent solutions upon compresses (either in alcohol or oily solution), or if used in ointment or paste, in the proportion of one to two per cent. Unna is said to have used a 5-per-cent carbolic acid solution in tincture of green soap with advantage. Tartaric acid may also be employed in the form of a glycerostarch in the strength of 1 part to 30, and belladonna may be used in ointment form in five- or ten-per-cent strength, using the tincture of the drug. The tincture of benzoin may also be incorporated in the following ointment:

Lanolin, 1 ounce;
Vaselin, ½ ounce;
Water, 1 drachm;
Tincture of benzoin, 1 drachm.

Camphor is also to be remembered as an excellent antipruritic in the proportion of

15 grains of camphor to 3 drachms of sweet almond oil, or the following prescriptions may be used:

Chloral, 15 grains;
Camphorated oil, 2 drachms;
Lanolin, 3 ounces.

Or,

Oxide of zinc,
Chalk,
Camphorated oil,
Lime water, āā 6 drachms.

When chloral is employed it may be dissolved in water or in alcohol in one-per-cent strength, or used in an ointment containing ten per cent. Chloroform water may also be applied if the skin is not irritated. Hydrocyanic acid may also be used in the dilute solution of 1 to 10,000, and menthol may be applied either in alcohol solution one- to six-per cent, in ointment or in paste one-per-cent, and also in the form of a mentholized soap. Sometimes salicylate of methyl or oil of wintergreen can be employed in an ointment in the strength of five-per-cent.

In certain instances, when it is desired to decrease inflammation underlying the irritated part a watery solution of ichthyol may be applied, or it may be used in the form of an ointment in the proportion of one to two drachms to the ounce; stronger solutions than this being apt to be irritating. Leredde also states that resorcin is a remarkable antipruritic, and that in watery and alcoholic solutions in the strength of two- to five-per-cent it modifies and cures persistent pruritus. So, too, watery solutions of corrosive sublimate in the strength of 1 to 1000, 1 to 500, and even 1 to 250 may be of value.

Of the physical methods of relieving this condition we should not forget the great value of as hot water as can be borne by the skin applied to the part which is locally affected. In other instances the bath of static electricity is useful. And in still others the itching part must be treated by the application of the electrocautery.

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### *THE TREATMENT OF WHOOPING-COUGH.*

In an exhaustive discussion of whooping-cough in general published in the *Clinical Journal* of November 5, 1902, VOELCKER has this to say of treatment. As he well says, this is a part of the subject which one cannot but approach with a slightly apologetic attitude. Some time ago, in looking up the drugs which had been used in the treatment of whooping-cough, the author found a larger list than he could find for any other curable or incurable disease. When we find a large number of drugs which have the reputation for being more or less specifics for a disease, we can be quite sure that no single one of them is much good. We can perhaps appreciate the difficulties which one has in some of these cases in judging of the effects of drugs when reminded that some of these patients scarcely whoop at all, some have only a slight cough, and in others the complications of the disease which are present make one averse to undertaking any experimental therapeutics. The drugs which the author has used have been antipyrin, belladonna, citrophen, bromoform, heroin, glycerin of carbolic acid, bromide of potassium and belladonna, creosote, chloride of ammonium, carbolic spray, thyroid extract. The author felt justified in using thyroid extract because he had a child with malignant disease of the kidney, and gave it thyroid extract in the hope of influencing the new growth, but it had no effect in diminishing the whoop. Lately he has been going back to a very old practice, namely, the use of antimony. A Swedish doctor who was over here recently told the author he knew of a specific which was much used abroad, and asked him to try it. Its composition is antimonii sulphurata rubra gr. 1/6, extract hyoscyami gr. 1/4, pulv. glycyrrh. gr. 3/4, pulv. gum acac. gr. 2 1/2, pulv. sacch. alb. q. s. ad gr. 10.

This was tried, and one case has done well on it, but further experience has not impressed the author with its value. Besides those were tried more or less generally carbonate of ammonium, strychnine, phenacetine, guaiacol, salol, and so on; and the author thus summarizes his experience:

Antipyrin was tried in eleven cases. There was distinct improvement following its administration in two of them; in three there was slight improvement; and in six it was doubtful if the drug had any good effect.

Belladonna was given in seven cases, and in three decided improvement took place; in two the patients seemed to improve; in two the effect was doubtful.

Citrophen was used in ten cases; in five distinct improvement took place, in one there was slight improvement, and in four there was little or no benefit. In one very obstinate and severe case, in which bromoform for two weeks, creosote for two weeks, antipyrin for one week, and glycerin of carbolic acid for three weeks had all failed to give relief, citrophen did undoubted good, though it is only fair to remember that this was only after seven weeks' stay and treatment in the hospital.

Bromoform was used in two cases. Its use is not unattended with danger on account of its oily nature and high specific gravity. He had one case of an out-patient admitted with symptoms of acute bromoform poisoning, and one case had occurred in the ward where the intoxication was mild; in both cases the symptoms followed shortly after the administration of the last dose in the bottle.

Bromoform should be dispensed in a dark bottle, kept in the dark, and the quantity of the mixture in the bottle should not be too great, so that the risk of an overdose of the drug in the later doses is diminished. Directions should be given that the bottle must be well shaken each time before pouring out the draught. The dose employed has been from two to five minims three to four times a day. In two cases there was distinct, in two cases slight, and in seven cases no definite improvement.

Glycerin of carbolic acid was used in fifteen cases; in one case there was distinct, in three slight, and in eleven no appreciable benefit traceable to its use.

Creosote was tried in seven cases; in two there was distinct, in one slight, and in four no definite improvement. The drug was given internally and as a vapor. One objection to the use of the vapor was the difficulty of confining the effect of the creosote to a given case, for the whole ward and the nursing staff in the ward became redolent of creosote.

Chloride of ammonium was tried in the hope that the drug might cause the secretion to become less viscid, and so easier of expulsion. The relief to a paroxysm of coughing which follows the mechanical removal of the viscid mucus from the fauces and mouth of a child suggested its employment, but the results obtained with it were by no means satisfactory. It was employed in four cases; in one it gave relief, but in three it was useless.

Heroin was only tried in two of the cases which the author analyzed in his lecture, though he is giving it a more extended trial. In one of these cases when pushed to doses of one-thirtieth of a grain every six hours it was very beneficial. In the other case it was of no benefit.

Carbolic acid spray was used in four cases, with slight improvement in two, and none in the other two.

Bromide of potash and tincture of belladonna were tried in six cases; one benefited distinctly, two slightly, and in three there was no improvement.

From this résumé of the results of treatment by certain drugs the author does not claim to have discovered or even confirmed the existence of any drug which could be called a specific for the disease.

Antipyrin, belladonna, and citrophen have given on the whole the most satisfactory results, though none of them has proved sufficiently beneficial to entitle it to exclusive use.

Creosote and carbolic acid are useful where there is much gastric and intestinal trouble.

Heroin certainly relieves the paroxysms of coughing.

During convalescence nothing has proved so useful as cod-liver oil and wine of iron.

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*THE TREATMENT OF CHILBLAINS.*

The *Journal des Praticiens* of November 22, 1902, points out that the treatment of this condition is preventive and curative. The preventive treatment consists in the administration of drugs like cod-liver oil, tonic doses of sulphate of quinine, ergot, digitalis, belladonna, and all the vasoconstrictors. The following prescription may be used for this purpose:

> Sulphate of quinine,
> Ergotine, āā 1 grain;
> Extract of digitalis, 1-10 grain;
> Extract of belladonna, 1-10 grain.
>
> To be made into one pill. Two or three of these to be taken each day.

Others prefer arsenic given in moderate dose. Another precaution is to avoid exposing the skin to great changes in temperature, and under no circumstances

should very cold or very hot water be employed for washing.

The curative treatment consists in the use of baths, solutions, ointments, and collodion. Of the lotions perhaps the best is spirit of camphor or the following powder:

Starch, 15 drachms;
Salicylic acid, 2 drachms.

Or,

Starch, 10 drachms;
Tannic acid, 15 grains.

Compresses as follows may be employed, morning and night:

Alum,
Borax, āā 1 drachm;
Rose water, 10 ounces.

Or tincture of iodine may replace the alum, as follows:

Tincture of iodine,
Borax, āā 1 drachm;
Rose water, 10 ounces.

In still other instances the following ointment may be employed:

Alum, 40 grains;
Lard, ½ ounce;
Cold cream, 1 drachm;
Iodide of potash, 15 grains;
Laudanum, 15 minims.

Or instead:

Coca butter, 1½ ounces;
Oil of sweet almond, 2 drachms;
Citric acid, 7 grains;
White precipitate, 4 grains;
Tincture of musk, 20 drops.

Or,

Boric acid, 30 grains;
Tannic acid, 15 grains;
Lard, 1 ounce.

Should the process go on to ulceration it may be treated by flexible collodion containing iodoform. Another useful application under these circumstances is a paste of starch and oxide of zinc of each two drachms, and vaselin six drachms. In still other instances an application of carron oil which is carbolated may be employed.

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### *AN EXPERIMENTAL RESEARCH INTO THE VALUE OF ADRENALIN AS A STIMULANT.*

To the *Cleveland Medical Journal* for December, 1902, MILES and MUHLBERG contribute the results of a research upon this very valuable medicament. Keeping in mind the fact that deductions drawn from animal experimentation are valuable only in so far as they are very suggestive when applied to human beings, they draw the following conclusions from their experiments:

1. Adrenalin may be of value in cases of so-called heart failure occurring during anesthesia, etc., especially when the ordinary heart stimulants, such as strychnine, digitalin, and normal saline solution, fail.

2. That it is more likely to succeed in those cases in which the respiratory centers are not paralyzed, since adrenalin does not appear to be a very powerful respiratory stimulant.

3. That when used, it should be given subcutaneously, and the site of the injection should be slowly but strongly massaged until the adrenalin shows its characteristic effect on the pulse.

4. That dilution with normal saline solution (10 per cent of the 1:1000), by making absorption slower, causes a more prolonged and a less energetic rise of the blood-pressure.

5. That while these experiments do not permit them to draw any conclusions in regard to bad after-effects, these were not observed in the animals experimented upon. The danger from secondary hemorrhage as a result of the high pressure must, however, be borne in mind.

6. Adrenalin subcutaneously is indicated on theoretical grounds for the vasomotor collapse following cocaine or chloroform poisoning, and possibly the shock after operation.

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### *THE MEDICAL TREATMENT OF RHEUMATIC PERICARDITIS.*

HUCHARD states in the *Journal des Praticiens* of November 1, 1902, that the treatment of pericarditis is medical and surgical—surgical when the effusion is sufficiently great to demand paracentesis, or when pericardotomy may be necessary because of pus in the pericardium. The preventive treatment of rheumatic pericarditis depends in the highest degree in the author's opinion upon rest and upon the administration of large doses of the salicylates at the very first appearance of the rheumatic pains, and a continuation of these doses after the pains in the joints have diminished under its use. He insists upon the necessity of administering doses as large as from one to two drachms to

an adult each day, and thinks to give smaller ones at this period is a waste of precious time. He believes that even children can support large doses of the salicylates—as much as 7 to 15 grains in a child of one year, 30 grains in a child of two to five years, and from one-half to a drachm or more in a child of six to ten years. The total dose should be divided and quite frequently administered, as the drug is rapidly eliminated, and it is important to maintain its influence constantly. Further on he insists again upon the necessity of maintaining the salicylate influence for eight or ten days after the disappearance of the pains in the joints.

When dry pericarditis develops medicines are of little value. Thus, veratrine has been recommended by Friedreich to diminish the frequency of the pulse, and large doses of tartar emetic have been employed by Jaccoud; but both of these remedies are manifestly inadvisable, as they depress the heart. Chloral has been recommended by Balfour as a cardiac sedative, and venesection has been strongly urged by certain practitioners. So, too, mercury in the form of calomel given in fractional doses to the point of salivation has been again and again recommended by certain practitioners, particularly in England, but it has not received general acceptation in other countries. Of the useful medicinal measures Huchard believes that the local abstraction of blood by means of leeches from the precordium or by scarification and wet cups is very useful. He also recommends, if these cannot be employed, mustard plasters or touching the skin over the heart at several spots with the thermocautery.

In regard to cold applications, such as the ice-bag over the precordium, he believes that this measure may diminish the activity of the heart, and so be useful; but the local application of heat is disadvantageous, in that it increases the rapidity of the pulse-beat. Opium and musk may be employed as nervous sedatives, and to relieve pain local applications of oil of wintergreen may be employed as a counter-irritant and for the absorption of the drug.

In regard to the use of digitalis in pericarditis the writer believes it is indicated if there is marked nervous irritability, palpitation, and tachycardia. In other instances where the heart is feeble subcutaneous injections of camphorated oil, ether, caffeine, and salt solution may be employed, as may also strychnine and digitalis. The diet should consist chiefly of milk and vegetables, and if a high arterial tension is present, nitroglycerin or some other nitrite should be employed to reduce it. Where pericarditis is followed by effusion, paracentesis is advisable provided sufficient time has elapsed for nature to absorb the fluid and it has failed to do so, and pericardotomy is necessary if the effusion is purulent.

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*A REPORT ON TUBERCULIN AS A MEANS OF DIAGNOSIS.*

In the issue of *American Medicine* of December 20, 1902, MADISON gives us the following conclusions as to this matter:

1. Patients may react to tuberculin and no evidence of tuberculosis be found at autopsy.

2. Six cases reported by the author seem to demonstrate that completely healed tuberculosis may react.

3. Cases of proved tuberculosis may not react to the maximum doses.

4. The evidence is not conclusive that other diseases than tuberculosis may react to tuberculin.

5. The margin of error of the tuberculin test is considerable, and probably not less than ten per cent.

6. The maximum dose should be higher than 4 milligrammes, and not more than 10 milligrammes. Small increasing doses are not advisable, as the reaction is not so likely to be distinct on account of the tolerance which may be produced. An initial dose of 3 to 5 milligrammes followed by the maximum dose is better.

7. The temperature should usually be normal before injections are given. When the temperature is distinctly above normal a negative result is of no value, as these patients will frequently not respond at all, even to large doses.

8. It seems quite certain that the glycerin extract of tuberculin deteriorates, and a fresh bottle should frequently be opened, care being taken to keep it in a cool, dark place. The .5-per-cent carbolic acid solution should be made up on the day it is used if possible. The author believes that deterioration of tuberculin is the prin-

cipal factor in producing delayed reactions.

9. It cannot be said that tuberculin injections are entirely without ill effects, but their use among suitable patients is no more dangerous than the use of chloroform and ether for diagnostic purposes, and is quite as justifiable as an early diagnosis of tuberculosis is of the greatest importance.

10. About 40 per cent of all female patients admitted to the hospital react to tuberculin.

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*DYSPEPSIA AND ITS TREATMENT BY ANTISEPTICS.*

To the *British Medical Journal* of November 29, 1902, RANKIN contributes a paper on this topic. He does not touch upon the acute type of the disease, for he believes there can be but little diversity in methods of managing it. Rest, and removal by one means or other of the offending stomach contents, insures a cure.

It will, however, be admitted that as regards chronic dyspepsia treatment must be devised on lines to suit the requirements of each variety of the disease.

The first thing to determine, if possible, is obviously the cause. Frequently none can be found, but improper food, insufficient exercise, mental worry, irregularity of bowels, or some other violation of the fundamental laws of health, are sufficiently common and demand setting right before any good can be expected to follow the administration of drugs. Errors of diet can be discovered in a large proportion of the dyspeptics who come before us, if we only take the trouble to search them out.

The chronic disorder, taken as a whole, is always associated, no matter what its type may be, with impaired powers of digestion, and so far as food is concerned one dietetic scheme is applicable to the earlier stages of all of them. No two cases can be dieted exactly alike, because there is no disease in which idiosyncrasy in regard to articles of food is such a pronounced feature.

Certain general rules, however, are necessary for the guidance, and with the reservation that any stereotyped plan is commendable only in the early stages of treatment, and that modifications will be required according to the necessities of each case, the following scheme may be accepted as a rough guide to what will be found suitable with the majority of dyspeptic patients:

*For Breakfast.*—Dry toast or stale bread with a moderate amount of butter, and accompanied by parboiled milk or cocoa. Whenever the stomach can bear it, a boiled or poached egg or a piece of white fish may be added.

*For Luncheon.*—Fish, fowl, or freshly cooked meat, a little smoothly mashed potato or purée of vegetable, stale bread or toast, and some form of farinaceous pudding made with milk or fresh fruit stewed and sweetened with saccharin.

*In the Afternoon.*—Stale bread or toast, with a little butter, and milk or cocoa. Tea infused in boiling milk is relished and well borne by some patients.

*For Dinner.*—A similar meal should be taken to that provided for luncheon, but it is safer in the earlier stages of treatment to forbid red meat at this meal, and to substitute for it sweetbread, tripe, calf's head, or game.

*Before Going to Bed.*—Sleep is often promoted by a cup of infant food or bread and milk.

As digestion improves greater variety may be added to the meals, and with a reasonable exclusion of absolutely indigestible articles, an early return to the ordinary routine of the household dietary should be encouraged.

If stimulants are taken at all, a small quantity of whiskey or brandy well diluted in one of the ordinary table waters may be allowed at the end of luncheon and dinner. Later on a moderate amount of light wine will do no harm.

In certain cases, particularly those belonging to the nervous variety of the disease, better results are achieved by giving the food in small quantities at a time more frequently repeated. Hurried meals, and mental or physical exertion immediately after, must be avoided. The food should be eaten slowly, thoroughly masticated, and well mixed with saliva before being swallowed. Fluids are best taken at the end of each meal; much fluid taken during the meal dilutes the saliva and gastric juice, and so retards digestion. Such indigestible substances as pastry, cheese, new bread, pork, salted or cured beef, shell-

fish, pickles, twice cooked meat, seedy fruits, and stringy or raw vegetables, are to be avoided. Sugar must always be taken in the greatest moderation, and tea is best forbidden.

Attention to general hygiene (regulated exercise, a daily bath, massage, galvanism, warm underclothing, cheerful society, change of scene and air, etc.) is an important aid to recovery.

In every case the mouth should be carefully inspected, and if the teeth are defective or carious the dentist's assistance should be sought at the very outset. It is easy to understand how the want of teeth must add to the difficulties of the subsequent steps in the completion of the digestive process, and also how putrefactive products which develop in carious teeth must be conveyed from the cavity of the mouth to the stomach, and there interfere with the normal work of that organ. And yet it is amazing how seldom this first and obvious detail of treatment is attended to.

When the disorder has been of long standing, ultimate success will be more rapidly attained if the stomach is washed out every morning for a few days by the aid of the siphon tube. Tepid water may be used alone as a lavement, or to each pint there may be added a teaspoonful of boric acid or sodium bicarbonate. In less chronic cases it may suffice to sip a tumblerful of piping hot water, flavored if so desired with a slice of fresh lemon, the first thing in the morning when the stomach is empty. One or other of these plans of lavage should be adopted in every case.

Constipation is the rule in dyspepsia; it is best combated by one or more initial doses of calomel and colocynth, which may be conveniently prescribed in a pill containing one grain of the former with four grains of the pill-mass of the latter drug. This should be followed by some such simple aperient as cascara sagrada, sulphur, senna, or rhubarb, given according to requirements; two grains of iridin, with three grains of extract of rhubarb, made into a pill and taken about five or six o'clock, forms an excellent combination, which not only acts as an aperient, but also as a gentle hepatic stimulant. If such a pill proves ineffective, its action can be assisted by a small morning dose of one of the natural waters, or by one or two teaspoonfuls of Carlsbad salts added to the early tumblerful of hot water.

As regards medicinal treatment, limits of space will not permit of any full discussion of the vast multitude of drugs that have been recommended and employed for the alleviation of dyspeptic troubles. The author only directs attention to those which, by a long process of elimination, he has personally found most useful, and particularly to point out the special value which he believes attaches to their combination with antiseptics.

Of all the antiseptics the author has used, he has found carbolic acid to be the best. It is a weak acid, and may be used in either acid or alkaline mixtures, and its taste has not been found objectionable.

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*CIRCUMCISION — NEW METHOD OF TREATING INFANT AND ADULT.*

Every adult male should have the glans penis perfectly uncovered and free from any foreskin, simply to be clean and healthy. The removal of it by operation is entirely unnecessary, says LONG (*Pacific Medical Journal,* October, 1902), for the foreskin, a wise provision of nature, may be retained with proper treatment of the male child during infancy or early childhood.

Every experienced practitioner has observed, with both men and boys, a perfectly free glans penis, the foreskin sufficiently well back to expose the entire glans, on whom no operation has been performed. If these cases could have been observed in infancy and childhood, it would have been readily noticed that the foreskin was more or less dilated and non-adherent, which condition allowed the glans to push its way through, or partially so, during every erection, and finally, as the person matured, the glans became perfectly free as much as though an early circumcision had been performed. Where this condition may not come about it will probably be due to a contracted and adherent prepuce, an irregularity that should be corrected.

Within a few days after the baby is born, and while being held in the lap of the nurse, a few drops of a two-per-cent solution of cocaine should be applied, preferably with a small dropper, into the

preputial opening, the little prepuce being held and drawn forward with one hand. After a few minutes the point of a small dressing or hemostatic forceps is inserted into the opening, care being taken to draw the foreskin well forward so as not to injure the meatus urinarius. By gently widening the blades dilatation may be performed sufficiently to push the foreskin well back beyond the corona glandis. If adhesions be present, they can be separated with a small grooved director or any suitable blunt instrument that may be found in the ordinary pocket case. The parts should be well washed with warm water and soap, as smegma is always present, and then anointed with oil or vaselin, being very careful to draw the foreskin completely over again, so that no constriction of the parts can possibly occur. The nurse should be instructed to push the foreskin well back each morning while bathing the baby, and after washing and anointing it, to bring it forward again as directed by the physician in attendance. Until the foreskin is perfectly free and dilated, the same frequent care is observed by the mother, after which once a week will be often enough for examination. If the foreskin is unusually long and narrow, the dilating may be repeated with cocaine and forceps after a day or two, or when any slight irritation has subsided. Boys should be instructed to care for themselves as early as possible, keeping the foreskin clean with free use of cold water and soap. If frequent examination by the physician is neglected, the foreskin will become foul, and slight adhesion may take place which might be readily broken up.

If the foregoing method of treatment were adopted in all cases of infants and children, says the author, operative interference would seldom be necessary. In uncomplicated cases he has been doing a simple operation having not a few advantages over the older method.

The covering of the penis being in the form of a cone-shaped tube, with its apex inverted, forming the inner or mucous lining covering the glans, and attaching itself back of the corona, it becomes necessary to simply shorten the tube in order to properly uncover the glans. This is easily accomplished by making the reduction at the base instead of at the apex. The section of skin to be removed is in the form of a triangle with each of the points rounded.

The operation may be done under general anesthesia, but a one-per-cent solution of cocaine answers admirably, carefully injected in small quantities about the site of the operation. The hair is clipped off quite short with scissors, shaving only the site of the operation, as the patient is more comfortable during the reproduction of the hair. The parts should be thoroughly washed with synol soap, and rendered as aseptic as possible with bichloride solution, one to two thousand. The cocaine is now injected, and the patient is soon ready for the operation.

The operator, drawing the skin back, should, remembering that the foreskin is double, measure to ascertain exactly how much shortening is necessary, and mark the three points with small forceps. Beginning at the juncture of the organ with the pubes and extending around either side about two-thirds the circumference, passing around the marking forceps and including them in the piece to be removed, with a neat curve the operator proceeds in a direct line to the dorsal forceps, passing around them and thence down the other side, encircling the other lateral forceps, and up to the point of beginning. The section of skin should be carefully dissected off, leaving the fascia and blood-vessels undisturbed. The parts are now approximated and the stitches put in, completing the operation.

Medium silk sutures, of best aseptic quality, are preferable. The first stitch is to be placed in the dorsal median line, and as many interrupted stitches as are necessary close to the sides. Any simple aseptic dressing is all that is necessary, being held by a perineal bandage. In cases where the foreskin is very tight, it would be advisable to dilate gradually for a few weeks before operating. Where this cannot be done there should be gentle and complete dilatation under anesthesia at the time of operating.

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### *PARAFFIN—SUBCUTANEOUS INJECTIONS.*

The results of some experiments of COMSTOCK (*Medical Record,* Nov. 1, 1902) aid in proving that subcutaneous

injections of paraffin fill in spaces of lost tissue in a very satisfactory manner. The injected paraffin does not remain entirely a capsulated foreign body, but becomes a bridgework and a part of the new tissue.

The paraffin must be used where it will be at all times above the bodily temperature, that embolism may be prevented. A choice of 106° or 107° F. is the best.

Comstock's mixture was soft commercial paraffin, and white cosmoline. This was sterilized by boiling for thirty minutes over a flame. The beaker was protected by an asbestos screen to guard against burning the mixture; at the proper time it was decanted to leave all sediment behind.

The best syringe is a metallic aspirator. The needle must be of fairly large size. The instrument must work perfectly, the plunger and all joints very tight, as melted paraffin goes every road but the right one. The filled instrument is left in hot, sterile water until ready for use. After thorough sterilizing, the instrument is taken from the water; then, forcing out the air, and waiting a second until the paraffin becomes a thready mass as it comes from the opening, the needle is inserted into the cellular tissue to the point where the elevation is to be begun. There the paraffin is gradually injected while the needle is being withdrawn. Care must be exercised at this point of the process that the paraffin does not cool too rapidly. Rapid cooling will make it come out unevenly. Firm pressure on the piston is necessary to guard against spurts; these would endanger the symmetry of the parts. The injected mass has a doughy feel; it can be molded to a certain extent. This may not be done, however, when there is too great tension on the skin surface; in this case it will assume its own form and flatten out.

The pain is so trifling, if the work is properly done, that a one-per-cent solution of cocaine at the point of puncture is all that is necessary.

Filling up the space with any liquid before using the paraffin disguises the deformity and makes it more difficult to tell exactly how much paraffin should be used.

On account of the natural shrinkage, it may be advisable to use more than one injection. If so, it might be well to make it in two or three weeks, and either a little above or below, or to one side, of the primary injection. There will thus be left some of the tissue elements between the two masses, preventing the destruction or retarding of growth of the new tissue cells beginning about this time to perforate the paraffin.

From the rapidity of the tissue growth, as shown by the experiments made, at least four months is required to fully organize specimens about two centimeters in length, one and one-half in width, and one in thickness.

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### *PANCREATITIS OF AN ACUTE CHARACTER ASSOCIATED WITH CHOLELITHIASIS AND GLYCOSURIA.*

A case of acute pancreatitis associated with cholelithiasis and glycosuria is reported by NASH (*Lancet*, Nov. 1, 1902). It appears to have been a simple infective pancreatitis. Cholecystotomy was performed, and the patient recovered.

The symptoms in this case, as the difficulty of making a correct diagnosis in such complaints is great, should prove interesting. The patient was a fat male, sixty years old, who had had attacks of epigastric pain extending over a period of seven years. The onset of the last attack was sudden, and the pain was in the epigastrium. There was nausea, vomiting, hiccough, and collapse. The temperature at first was subnormal, but in the course of two days it rose two or three degrees beyond the normal. The pulse was 160. The whole abdomen became enormously swollen and suggested intestinal obstruction. This was relieved by enemata and aperients, but quickly reappeared. Later, as the abdominal swelling subsided, there was increased resistance over the pancreas, giving the impression of effusion into the lesser peritoneal cavity. At the operation fat necrosis was seen.

The gall-bladder contained a large calculus. It was decided to remove this and to drain the gall-bladder, it being thought that the presence of a stone might keep up a condition of catarrh in the bile passages which might spread to the pancreas. The first incision was closed and a second one was made over the gall-bladder, which was opened. A stone weighing 275 grains was removed; it measured one and a half inches in length by one and a quarter

inches in width. The fluid in the gall-bladder consisted of mucus stained with blood and bile, and the lining of the gall-bladder was much injected. The gall-bladder was sewn to the cut edges of the peritoneum, and a tube was inserted. The wound healed well, and in about three weeks the patient was able to walk about. The pulse gradually became slower, but at the end of six weeks it was still over 90. At about the same time the urine contained four and a half grains of sugar per ounce. Three months later the specific gravity of the urine was 1017, and the amount of sugar was four and a half grains per ounce. At the end of another six weeks the specific gravity was 1027, and the urine was free from sugar.

The stone in the gall-bladder is believed to have been accompanied by a state of inflammation of the bile passages. Some infection probably spread along the ducts of the pancreas to the gland itself. The presence of glycosuria, a rare occurrence in pancreatic disease, was probably due to the destruction of the pancreatic tissues.

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*CANCER AND OTHER MALIGNANT DISEASES; TREATMENT WITH X-RAYS.*

The results so far obtained with *x*-rays in the treatment of malignant diseases are certainly sufficient, asserts GRUBBE (*Medical Record,* Nov. 1, 1902), to warrant careful consideration whether they should not displace in some cases the use of the knife. This treatment has established for itself a field in the therapeutics of lupus and epithelioma. The future may see its greatest application in the treatment of patients immediately after operation to prevent the possibility of recurrence.

Ignorance of the fact that there are a great variety of *x*-rays probably accounts for much of the difference of opinion regarding this form of treatment. Different tissues, also, demand different degrees of *x*-ray value.

The inflammatory reaction, or dermatitis, produced is harmless, and in most cases, if the parts were not meddled with by the application of strong chemicals, especially carbolic acid in some form or other, nature would effect a cure.

To prevent the action of the rays upon surrounding tissues, a special lead-foil mask should be used. This resists the passage of the rays to healthy parts. To retard burning, apply plain vaselin to the parts directly exposed.

A number of the patients under the observation of Grubbé have remained free from recurrence for periods ranging from six months to a year and a half.

Among some of the main points accentuated by this author may be noted:

1. Relief from pain is a most prominent feature.

2. Retrogressive changes are noticed in all primary cancer or tuberculous growths.

3. There is a pronounced effect upon internal cancers.

4. The greatest value of the *x*-rays is obtained in treating postoperative cases to prevent recurrence.

5. Dermatitis, if properly produced, is within certain limits a desirable feature of the treatment.

6. Only tubes which allow of perfect control of vacuum should be used.

7. Abnormal cells are affected more than the normal.

8. Hemorrhages and discharges are decidedly lessened and ultimately cease in the majority of cases.

9. Even in the hopeless, inoperable cases, the *x*-ray prolongs life, makes the patient comfortable, and the last hours free from pain.

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*DISLOCATIONS OF THE SHOULDER; NEW METHOD OF REDUCING.*

A new method has been devised by HOFMEISTER (quoted in *Annals of Surgery,* August, 1902) for the reduction of a dislocated shoulder. The patient is first comfortably placed on his sound side. Extension straps are then applied to the arm of the affected side, as high up as the deltoid insertion, and secured with a roller bandage tightly applied, to prevent sliding of soft parts on the bone. A rope connected with the straps is guided over a set of pulleys attached to the end of a rod, which rod is raised to a sufficient height to permit of full extension of the arm. Ten pounds are first fastened to the free end of the cord, and at intervals of five minutes additional ten pounds are added until forty pounds are reached. Action of this for five to fifteen minutes suffices to effect a reduction, which may

set in sooner sometimes. In four instances reduction was hastened as soon as the head of the humerus was on the margin of the glenoid by drawing the head toward the acromion process, removal of the weights, and slowly adducting the arm. The constant moderate traction of the weights overcomes the contraction of the muscles.

The avoidance of narcosis and its absolute harmlessness may make this method more popular than the manipulative procedures of Kocher.

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*FINGER-NAIL AFFECTIONS.*

The treatment of some affections of the finger-nails is indicated by LEVISEUR in the November (1902) number of the *Journal of Cutaneous and Genito-Urinary Diseases.*

Prominence is given to the treatment of an affection of the finger-nails that the author has only seen in adults. It is found usually in combination with seborrheic eczema and pruritus ani or scroti. It attacks the nail-plate primarily, starting from the region of the lunula, and very quickly it spreads all over the nail. The individual lesions are minute, round, shallow holes of the size of a very small pinhead, arranged sometimes in regular concentric lines. The entire surface of the nail-plate is covered with them. Leviseur has not seen it together with psoriasis, of which a similar affection is a characteristic and early symptom. Salves do not make any impression. In four cases a cure was effected with a one-per-cent solution of permanganate of potash. The fingers were bathed for about ten minutes twice a day. The discoloration due to the permanganate was then removed with a second bath of an oxalic acid solution of two-per-cent.

An interesting case is noted of eczema of several nails on each of the hands of a woman, sixty-seven years old. It was present for two years, when suddenly an onychia developed on one of the diseased nails. This was followed shortly by an erysipelatous rash spreading over both hands, arms, and feet. The temperature was 101° at night for a few days only, when it became normal. There was present great general weakness, probably due to the sleeplessness caused by continual severe itching and burning. Finally blebs of the size of a quarter dollar began to form, containing turbid fluid. They were opened, and a wet dressing with liquor Burowi, five per cent, was applied to the affected parts. After the condition had somewhat improved, the fingers, the hands, arms, and feet were bandaged with strips covered with a ten-per-cent salicylic soap plaster devised by Professor Pick and modified and introduced into this country by Dr. Klotz, of New York. The treatment cured the patient inside of six weeks. Three nails on one hand and two on the other were shed. During the attack the two daughters of the patient, while nursing their mother, developed at various times an ordinary infectious onychia. The case may serve as an illustration of the possibility of the development of a serious streptococcic infection of the skin from a chronic eczema of the nails by the transitory stage of an onychia or perionychia.

Workers with chemicals containing a large percentage of arsenic often suffer from deep ulcerations, particularly in the region of the lunula, but also of the nail-bed on the sides of the free edges. When the precaution is taken to bandage every suspicious sore with iodoform gauze no new cases occur, and moist iodoform gauze acts almost as a specific.

Compared with ringworm of the nail, favus is by no means as rare and much easier to diagnose. This is mainly due to the fact that favus of the scalp is most frequently found simultaneously, or, at least, the characteristic traces left behind by the ravages of the achorion are still present. The most marked clinical symptom is probably the formation of hollow spaces more or less filled with detritus starting from the free edge of the nail toward the lunula. The surface of the nail-plate is left intact, the mycelium growing best on a soil which is little exposed to air or the changes of temperature. Avulsion of the nails is indicated where the disease has made considerable inroad. For milder cases, a cure may be effected with a saturated solution of potassium iodide and metallic iodine.

Care should be taken not to apply strong caustics, as, for instance, caustic potash, or to use a sharp spoon, for the destruction of even a very slight part of the

matrix will invariably result in the formation of a disfigured or distorted nail. Injury of the nail-bed, provided it be moderate, is not so important for the welfare of the nail. Small, deep, linear cuts or contusions of the nail-bed make more trouble than large, flat, superficial injuries.

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### *GASTRIC ULCER: PERFORATED CASES TREATED BY ABDOMINAL SECTION AND SUTURE.*

Perforation occurs probably in about fifteen per cent of all cases of gastric ulcer.

In a typical case of sudden acute perforation, notes HEATON (*British Medical Journal,* No. 2167, 1902), the symptoms are usually so pronounced as to leave no doubt as to what has occurred. The sudden intense burning epigastric pain, the collapse and distress, and the vomiting, all point to some perforative lesion having taken place within the abdomen. The skin is cold and clammy, respirations are shallow and thoracic in type, the pulse rapid and small. Thirst is usually a distressing symptom, and vomiting may be repeated constantly. The abdomen is at first retracted and the abdominal walls are extremely rigid. Later the abdominal walls become relaxed, retraction gives way to distention, and the symptoms of acute general peritonitis rapidly supervene.

There are several other acute abdominal disorders, the sudden onset of which may simulate the perforation of a gastric ulcer. These must be borne in mind when the diagnosis is being made. The chief of them are: Sudden acute intestinal obstruction, such as strangulation by a band; a ruptured duodenal ulcer; acute perforation of the appendix vermiformis; ruptured tubal gestation; hemorrhagic pancreatitis; poisoning by acute gastric irritants; and the various forms of colic, particularly biliary and renal. The diagnosis of some of these disorders from a perforated gastric ulcer may be at times wellnigh impossible; but in the majority of cases a careful attention to the clinical symptoms and clinical history of the patient will enable a correct diagnosis to be made.

Everything should be done to expedite the various steps of the operation, and to minimize its shock upon a patient who is already in a state of extreme depression. The operating room must be warm, the operating table artificially heated, and the patient warmly clad and not unnecessarily exposed. Toward the close of the operation the intravenous injection of one or two pints of normal saline fluid is also of great value in counteracting the shock.

The stomach is examined through a median abdominal incision, which may be enlarged by means of a horizontal incision through the left or right rectus muscle, as may seem most useful when the perforation has been localized. The stomach is to be systematically examined first of all on its anterior surface, and if no perforation is discovered the posterior surface may be examined by tearing through the gastrohepatic or gastrocolic omentum. Thick flakes of lymph will generally guide toward its actual seat.

The perforation when discovered is to be closed by a single or double row of Lembert sutures. These may be passed with ease, when the seat of the perforation can easily be brought into view, when the perforation is small, and when there is not much surrounding induration. On the contrary, when the perforation is a large one, and the stomach wall around much indurated, this may be a matter of great difficulty, as it is almost impossible in these cases to invaginate the edges of the ulcer, and to prevent the sutures cutting through the friable stomach wall.

In such cases bring up and fix *in situ* a piece of omentum or some neighboring viscus. In one of the five successful cases treated by Heaton the round ligament of the liver was so utilized.

The perforation being closed, the abdominal cavity must be cleansed from any stomach contents which may have escaped into it. In some cases there has been but little such leakage; and in such cases the area around the perforation is best cleansed by careful sponging.

But when there has been much leakage through the perforation the whole abdominal cavity needs cleansing. The best mode of so doing is to systematically and thoroughly irrigate the whole cavity with hot saline fluid. Many pints of such fluid must be used, and it must be made to penetrate into every part of the cavity, special care being taken to cleanse the lumbar regions on each side and the peritoneal recesses between the liver and dia-

phragm. When all excess of this fluid has been removed a drainage tube should be passed into each loin, and a third to the bottom of Douglas's pouch. This latter tube is best brought out through a counter-opening made above the pubes.

The two chief points in the after-treatment are the feeding and the treatment of shock.

The shock of a prolonged operation in an already depressed patient is apt to be extreme. The intravenous injection of one or two pints of normal saline fluid at the close of the operation is of great value in these cases, and is to be supplemented by hypodermic injections of strychnine and brandy enemata.

No food should be given by the mouth for the first three or four days, or for a still longer period if the patient's strength is being maintained.

During this period nutriment is to be given entirely per rectum. Heaton gives alternately every four hours an enema of four ounces of peptonized milk, and one of the same quantity of peptonized raw meat juice.

Once every twenty-four hours a pint of warm saline fluid should be slowly injected into the bowel high up and allowed to remain there. In one case feeding was in this way carried on entirely per rectum for fourteen days, and during the whole of that time the patient complained of nothing worse than an occasional slight thirst. When food is afterward given by the mouth, great care is of course necessary in its administration at the commencement.

Mayo Robson has collected from medical literature 486 cases, with 227 recoveries and 259 deaths. This would give a recovery rate of 44.6.

Heaton has endeavored to collect all the cases operated upon in one or two large London and provincial hospitals during the last five years, including only those where upon operation an actual perforation was seen and sutured. He finds that in those institutions there have been in all forty cases of suture of perforated gastric ulcer, with fourteen recoveries and twenty-six deaths. This would give a recovery rate of 35 per cent, a figure much lower than that usually given, but probably nearer the real truth.

### *FRACTURE OF THE NECK OF THE FEMUR, AND COXA VARA.*

Fracture of the neck of the femur in the young and adult, despite the assertions of the text-books, according to WHITMAN (*Annals of Surgery*, November, 1902), is not so uncommon. The correct diagnosis is more uncommon. In all cases of injury about the hip, the importance of careful measurement is suggested. If the physician finds actual shortening of the limb he can scarcely overlook the confirmatory signs of fracture.

As regards the treatment of impacted fracture, under favorable conditions Whitman would not hesitate to attempt to reduce the deformity by fixing the limb at the limit of normal abduction under anesthesia with a plaster spica bandage. He has applied this method successfully in children, and thinks it can be successfully applied to older persons.

The fixation should be of service also in preventing the additional limitation of the range of abduction caused by accommodative shortening of the muscles during the period of fixation.

For the protection of the weakened part for a time, after ambulation is resumed, there is employed the ordinary hip-splint as a traction appliance in the more painful cases, or as a simple perineal crutch when complete or partial removal of the strain is indicated. This support relieves the discomfort and enables the patient to walk about without the aid of crutches. It is, of course, important that there should be massage and forcible manipulation for the purpose of resisting the tendency toward adduction of the limb as an adjunct to mechanical treatment wherever practicable.

Whitman believes the evidence supports his theory that in all but very exceptional cases the neck of the femur, in childhood, will give way at some distance from the epiphyseal junction. In adolescence, however, the newly formed bone about the epiphyseal cartilage is apparently a weak point, which is indicated by the fact that the deformity of coxa vara of the adolescent type is often most marked at this point. Such cases of coxa vara in which the disability is suddenly increased by a fall, or even by a slight injury, may be mistaken for true primary epiphyseal sep-

aration. Indeed, several cases have been reported as such.

True epiphyseal separation should be treated in the manner suggested for ordinary fracture, as abduction of the thigh would be the attitude most likely to approximate the fragments. If an open operation is performed, there should be an attempt to either actually replace the head of the bone or to simply cut away the projecting portions that interfere directly with movement. Afterward an osteotomy of the shaft may be indicated to restore the normal angle of the neck.

In the treatment of deformity when direct replacement is impracticable, as in the ordinary type of coxa vara, traumatic or otherwise, after the forcible stretching of the contracted tissues, the surgeon should restore the normal angle between the shaft and the neck by removing a sufficient wedge of bone from the base of the trochanter. A portion of the cortex at the apex of the wedge on the inner side of the femur, opposite the trochanter minor, should be preserved. The thigh is then gently abducted, and the trochanter and neck being fixed by direct contact with the upper border of the acetabulum, further abduction closes the wedge-shaped opening. The limb is then retained in this attitude of complete abduction by a plaster spica bandage until union is complete. The short, or preferably the Lorenz, spica will fix the part securely, for as the continuity of the femur is unbroken, there is no danger of rotation or other displacement of the fragments. Within a few weeks the patient may be allowed to walk upon the limb, for in this attitude of complete abduction the body is so inclined toward the limb that the line of weight is practically that of the neck of the femur, and functional use that does not entail overstrain aids repair. This operation, performed as described, is better adapted to the treatment of children than for older persons. In the majority of cases of the adolescent type, simple linear osteotomy is the operation of choice.

If a diagnosis of coxa vara is made in the early stage, its further progress may be checked, temporarily at least, by appropriate mechanical support. This treatment will relieve the secondary muscular spasm and the direct discomfort in the more advanced cases. It must be continued, however, for an indefinite time, and there is a probability of the recurrence of the symptom when ordinary use of the limb is again permitted. Because it is a palliative rather than a curative treatment, Whitman prefers to this treatment the operative procedure whenever practicable.

The least favorable cases are those of the rapidly progressive bilateral type in which the distortion is most marked in the vicinity of the head of the femur. In these cases forcible abduction of the thighs in the manner described may correct in some degree the deformity, and it may be employed as a tentative measure when more radical treatment seems to be contraindicated.

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### *SUBCUTANEOUS DIVISION OF THE TENDO ACHILLIS FOR THE RELIEF OF EQUINUS FOLLOWING INFANTILE PARALYSIS.*

With a view to determining whether the increased length of the tendo Achillis consequent upon its subcutaneous division for the relief of equinus has any effect in modifying the function of the calf muscles, the results in some seventeen cases have been studied by HIBBS (*New York Medical Journal,* July 19, 1902).

The operation in each instance was that of subcutaneous division of the tendo Achillis, with, in some instances, division of the plantar fascia and immediate overcorrection of the deformity. The foot was placed in a fixed dressing at an angle of 90 degrees to the leg, and, the patient confined to bed, kept so from four to six weeks. There was constant supervision afterward, and the patients wore some form of protective apparatus.

In eleven of these cases no force was felt in the calf after the foot reached 80 degrees in extension. In four cases the force of the muscle could be felt to 90 degrees, in others it could be felt from 90 to 95 degrees, while in two it reached 110 degrees.

It would appear that the modification of the function of the calf in these patients was the result of the shortening of the muscle in the production of the deformity; secondly, the further shortening of the muscle as a result of the lengthening of the tendo Achillis by tenotomy in the correction of the deformity; and thirdly, the still further shortening of the muscle as

a result of the lengthening of the tendon caused by the elongation of the structure forming the bond of union between its divided ends.

How frequently success may be reached in cases of this class can hardly be determined by the study of so small a number. That it does occur, however, and probably with greater frequency than is generally supposed, is clearly evident.

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*GASTRIC ULCER: OPERATIVE TREATMENT.*

MOULLIN (*Medical Press,* No. 3315, 1902) is certain that if operations were performed more freely in cases of gastric ulcer, not only would many more lives be saved, but patients would be relieved of an enormous amount of suffering. A study of the statistics on the subject forces him to conclude that the non-operative method of treatment is not so successful as it is thought to be. The operation should be performed in the more serious cases, those which otherwise would surely terminate fatally.

The indications are threatened perforation and hemorrhage. The former may present no symptoms of any kind until perforation actually takes place. The greater part of the wall of the stomach is absolutely devoid of sensibility, and may be cut, or pinched, or burnt without the patient being aware of it. It is only the parietal peritoneum that has sensory nerves, and an ulcer of the stomach does not cause pain until the irritation, spreading after it, affects the parietal peritoneum, or that which lines the under surface of the diaphragm. Pain or pressure, therefore, is not so much an indication of ulcer of the stomach as that the ulceration is spreading and is therefore likely to end in perforation. The second attack of hemorrhage gives an indication for operation. Chronic ulcer is exceedingly serious, not only in itself, but from the complications it entails; if treatment has been tried thoroughly once unsuccessfully, there should be no further delay in operating.

In recurrent ulcer the patients in the intervals between the attacks are perfectly well. There is either some condition of the stomach itself or of the general constitution which predisposes to the successive development of ulcer of the stomach. Until this condition be known and remedied it is better that gastroenterostomy should be performed and recurrence prevented by placing the stomach at perfect rest. This course is better than letting the patients run the risk of hematemesis or of perforation. Instances have been noted in which acute ulcers, which could not have been present more than a week or two at the most, were found, although the symptoms had lasted on and off, with intervals of perfect freedom, for several years.

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*CANCER TREATED WITH X-RAYS.*

The cure of cancer in easily accessible and superficial cases may undoubtedly, in the opinion of BECKETT (*Australasian Medical Gazette,* Sept. 20, 1902), be brought about with the *x*-rays. As a rule, however, the treatment is tedious, difficult, and somewhat expensive to carry out.

The well marked effects, commencing often after the first application, are, in their order, cessation of pain, gradual disappearance of the offensive smell, clearing up of the surface, cessation of the cancer growth. This is followed after a few weeks' treatment by diminution of the cancer growth, the discharges becoming less, a gradual healing commencing at the edges.

Beckett recommends the most powerful coil for this class of work. He usually works with a 20-inch coil, and seldom goes beyond a 10- or 12-inch spark. Such a spark from a coil of this character is quite a different thing from the spark of a 10- or 12-inch coil, and gives off from a powerful *x*-ray tube a much larger volume of *x*-ray, which is what is wanted. A break that gives a great variety of speed should be employed.

According to the effect desired, the voltage should be from 8 up to 20, but the point that requires watching most carefully is the actual amperage passing through the coil. There should be from 5 or 6 up to as much as 12 and even 15 amperes, which is much larger than is usually used. The current should be obtained from accumulators, to get a steady and reliable current.

If there is any secret in the success of the treatment, it lies in the tubes. A safe tube to use is one with an equivalent spark

resistance of 6 to 7 inches, and deeper penetration can be obtained, especially with a harder tube. Beckett's plan is to take a very hard tube and to make it hot over a large Bunsen burner. The tube should be able to stand this and yet not go below 6-inch resistance. If this is run for three minutes, it is to be heated up once again as hot as the tubes will stand. A good reaction can thus be got with much deeper penetration than is given by a soft tube.

As to the activity of the tubes generally, their peculiarities can only be discovered through daily experience.

For screening, sheet-lead is the only absolutely reliable material. In long cases lead-foil lets the rays through, but this sometimes may be an advantage.

The rule for beginners is to keep the tube at a safe distance. Injurious effects may not follow if the tube is kept at a distance of 12 inches and upwards. The time of exposure, according to the degree of reaction to be obtained, varies from as little as one minute up to fifteen minutes. Cases at first should be treated daily, nothing less is of any use. Even twice a day would be an advantage, but once the reaction is obtained and the patient is on the road to recovery, then two or three times a week is sufficient. Finally there is recommended a long period of once a week to insure against recurrence.

As to recurrence, the treatment that has been beneficial, just as in the treatment of cured cases of acute rheumatism, can be repeated. There is always a certain risk of the cancer returning, since the patient has exhibited a cancer diathesis.

If the growth is only small, superficial, and has not existed very long, it will probably clear up under the *x*-rays. If it does not, or if it has existed for long and is of any appreciable size, it is advised to cut out the cancerous tissue only and to expose, at the time of the operation, the seat of the growth to as powerful a source of the *x*-rays as possible, the patient of course being under chloroform. This may be done for ten minutes or more, in fact up to the limit of safe endurance. The wound is then to be closed, and to be treated afterward with daily and similar applications of the *x*-rays. Beckett operated after this manner on one of his cases with very satisfactory results.

*X-RAYS IN THERAPEUTICS.*

The results from the use of the *x*-rays in his practice have been so gratifying to HARRIS (*Australasian Medical Gazette*, Sept. 20, 1902) that he predicts a more general use of this therapeutic agent in the treatment of many indolent forms of skin disease.

After experimenting on a number of cases he has formed the following conclusions:

*Lupus Erythematosus.*—The two most common forms in which this disease occurs are the erythematosus and sebaceous varieties. Of these the former is the more difficult to deal with, and a long time is required for treatment. It is questionable even then whether improvement results. The sebaceous form rapidly responds to treatment. As a rule twenty to thirty sittings suffice. Occasionally a reaction occurs producing inflammation of the part under treatment. If due care be not exercised this might even produce alarming effects. It is not essential that any reaction should be produced to effect a cure, for of nine cases of lupus treated thus, five suffered no reaction.

The results have been very satisfactory with the exception of the first case. Then there was produced an excessive reaction, and as a consequence the patient did not report herself again for further treatment. One case of the erythematosus variety under care at time of reporting was progressing only moderately.

*Rodent Ulcer.*—This was in a man aged sixty-four, and involved the end of the nose. It was of several years' standing, and had been scraped once. This case rapidly responded to treatment, and after thirty-two sittings appeared to be quite healed.

*Hypertrichosis.*—The hairs in the several cases tried fell out after fifteen to thirty sittings, but soon reappeared. In one case the treatment was continued, on and off, for seven months, but finally it was given up in despair. The hairs were removed effectively by electrolysis.

*Keloid and Hypertrophied Scar Tissue.*—In one case where hypertrophied scar tissue formed after an operation for tubercular glands of the neck, this was removed after three months' intermittent treatment with the rays.

## Reviews.

A Text-book of Practical Medicine. By William Gilman Thompson, M.D. Price $5.00. New York and Philadelphia: Lea Brothers & Co., 1902.

This is the second edition of Dr. Thompson's exhaustive work upon Practice, and can be recommended to teachers of medicine universally as an accurate and complete compilation of the facts which are commonly brought together in a work dealing with this branch of medicine. It opens, as do most modern works, with the infectious diseases in general and typhoid fever in particular, and in this article we find embodied much of the more recent information which has been gained by the sad experiences of the Anglo-Saxon race in the Spanish-American and Anglo-Boer wars. The statement that during the Spanish-American war there were 20,738 cases of typhoid fever, or almost one case in five, amongst the American troops engaged is a most striking one, and the great prevalence of this disease is brought home to us with still greater force when we learn that nearly 87 per cent of all the deaths in the American army during that war were due to this disease.

We are glad to notice that Dr. Thompson emphasizes the fact that young children suffer from typhoid fever, but we do not think that he admits as great a frequency of this disease in young children as actually exists. In discussing the treatment of typhoid fever there are several points which we have not found in our own experience as practicable. Thus, we notice that it is advised that the patient throughout the disease should lie naked in bed covered only by a sheet, that such patients never take cold, and that a night-dress interferes with bathing, wrinkles under the skin, and becomes soiled with dejecta. While it is our experience that patients with fever do not take cold, nevertheless it is not practicable to have patients with no clothes on and covered only by a sheet in the average ward, at least during the cooler periods of the year. We are glad to notice that Dr. Thompson recommends the employment of rubbing or friction while the patient is being tubbed. He asserts that the bath is not curative in the sense in which medicinal remedies are employed, and in this we differ from him, since we believe that it promotes a cure much more than does the administration of any drug which has been introduced. We also think that further emphasis should be laid upon the fact that the bath materially increases the elimination of toxins in the body. The method of administering the cold pack for hyperpyrexia, when tub baths cannot be used, is not nearly as efficacious in reducing the temperature as are other means which are commonly employed.

In regard to the important question of feeding in typhoid fever, we note that Dr. Thompson is evidently not one of those who are in favor of a very liberal diet during the course of the disease, but early in convalescence he recommends a more and more liberal diet as each day goes by. For hemorrhage he relies particularly upon opium, morphine hypodermically, and turpentine emulsion.

In the treatment of croupous pneumonia we are glad to note the excellent advice given that all antipyretics and expectorants should be avoided; that bleeding is only justifiable in the earliest stages in highly sthenic cases, and that it is usually resorted to too late. Alcohol, strychnine, and caffeine in pneumonia are regarded by the author as our best cardiac stimulants in the later stages of this disease. We think that the section upon the treatment of this malady might be enlarged with advantage. The difficult subject of hepatic cirrhosis, which even yet is in a somewhat confused state, receives adequate attention.

To those who desire an exhaustive work upon the practice of medicine, this one can be cordially recommended.

Applied Surgical Anatomy, Regionally Presented. By G. Woolsey, A.B., M.D. 125 Illustrations, Most of Them Colored. New York and Philadelphia: Lea Bros. & Co., 1902.

This work, beautifully illustrated and most excellently and systematically arranged, embodies rather the experience of the skilled and scientific anatomist than that of the practical surgeon. Thus, it is stated that in individuals of medium height and weight the head measures one-eighth of the body height in man and ten-seventy-fifths in woman, and weighs one-

seventeenth of the body weight in man and one-sixteenth in woman, which, though doubtless true and a fact of scientific importance, has no bearing upon the practice of surgery. This by no means implies that the author has neglected to accentuate those anatomical facts which are of distinctly practical value. Indeed, this has been done throughout the work. But the anatomy overshadows the surgery.

In discussing the mechanism of the anatomy of Pott's fracture, no mention is made of the splitting of the outer articular facet of the tibia, a complication which is more likely to be unrecognized and produce permanent disability than the more superficial fractures.

The subsection devoted to clubfoot, even from the anatomical standpoint, could scarcely be satisfactory to the modern orthopedist. Most surgeons would not agree with the author to the effect that fixation of the kidney is due to the embedding fat derived from the subperitoneal connective tissue, and to the overlying parietal peritoneum. It is satisfactory to note that due attention has been given to the frequent anomalies of the arterial supply to the kidney. The statement that the common bile-duct may be exposed at its lower end by opening the second portion of the duodenum, in which it may be felt by the finger as a cord-like channel, along the posterointernal aspect, is one which might lead an operator into serious error. It is noted that by pushing the liver up and retracting the transverse colon down, and perhaps pushing the stomach to the left, we get room for exploration and operation, though all the biliary passages lie at an uncomfortable depth. No mention is made of the great help incident to flexing the dorsolumbar vertebræ by means of sand-bags placed beneath the small of the back.

In speaking of the layers of the intestinal wall, it would seem wise to mention the submucous fibrous investment, since this is the only one in which the stitches are held. It is, moreover, news to the profession that the catgut of commerce is made from the muscularis mucosa of sheep. Ulcer of the duodenum scarcely receives the attention which this lesion demands.

These few points taken at random do not militate against the excellence of this work as a practical anatomy, and as such it is to be heartily commended. Both the author and publishers have combined to produce an admirable work.

DISEASES OF THE ANUS, RECTUM, AND PELVIC COLON. By James P. Tuttle, A.M., M. D. Eight Colored Plates and 338 Illustrations in the Text.
New York: D. Appleton & Co., 1902.

This volume proves a welcome addition to the literature of rectal surgery.

After an opening chapter on the embryology, anatomy, and physiology, extremely well done, malformations of the anus and rectum are considered. From the succeeding chapter upon examination and diagnosis it is evident that the knee-chest posture is the one preferred. The various specula and instruments employed are described and figured. There is a brief but satisfactory discussion of examination of the feces. Proctitis, sigmoiditis, and colitis are next considered. The therapeutics of these various conditions are given in detail, and also of tuberculosis of the anus, rectum, and pelvic organs, venereal diseases of the anus and rectum, and non-specific ulceration. Fissure is treated by applications for four weeks. Should these fail, dilatation, incision, or excision is advised. Fistula receives the space its importance demands. In certain cases excision of the tract with primary suture is advised. A number of ingenious operations for the cure of fecal incontinence are illustrated. For rectal stricture proctotomy is suggested, consisting of a partial or complete section of the stricture.

The important subjects of constipation, obstipation, and fecal impaction are treated from both a medical and surgical standpoint, the author recognizing that the so-called rectal valves may be an important factor in the development of this disease. Pruritus ani is treated with carbolic acid, salicylic acid, and glycerin, together with a great many other antipruritic remedies. Nerve section is not mentioned as a possible cure in obstinate cases.

Internal hemorrhoids, if mild, may be treated by dilatation; if capillary, by cauterization, nitric acid being employed. The galvanocautery and ligature are also suggested. For uncomplicated varicose hemorrhoids the injection treatment is ad-

vised. It is designed to produce an "inflammatory induration of the hemorrhoidal mass through which the circulation is retarded or partially cut off, but which does not go to the extent of cauterization or strangulation so as to result in sloughing.'" The author's choice in cases of hemorrhoids that require operation is for the clamp and cautery.

Tumors of the rectum, with the extensive operations required for their removal, are carefully considered. There is a final chapter on recto-colonic alimentation.

This book is a valuable contribution. It contains nearly all that is modern, with a dispassionate discussion of the relative merits of the various procedures. It should rank with the best books on this subject.

## Correspondence.

### *LONDON LETTER.*

By George F. Still, M.A., M.D., F.R.C.P.

One of the most interesting events of the past month is the inauguration of a Therapeutical Society in London for "the advancement of knowledge in pharmacology and therapeutics." The methods to be adopted for this end are "the holding of meetings, the reading of papers, the exhibition of drugs and specimens, and such other means as the Council may determine."

The first meeting of this new society was held on January 20 at the Apothecaries' Hall, and it augurs well for the society that it should have "a local habitation" in so appropriate a place, and under the auspices of so venerable an institution. The chair was taken by the Master of the Apothecaries' Society, Mr. W. Parson, in the absence of the distinguished President of the new society, Sir Thistleton Dyer. About thirty representatives not only of medicine but of allied sciences were present, and keen interest was shown in the proceedings. If the communications brought forward at the first meeting may be taken as a sample of the future work of the society, there can be little doubt that it has a useful future before it, and will do much to advance the scientific study of therapeutics.

Dr. Gordon Sharp, of Leeds, read a paper on Australian bitter bark (*Alstonia constricta*), and on dita bark (*Alstonia scholaris*). He has made a careful study of the alkaloids of these barks, and finds that ditamine or ditaine derived from the latter has an action very similar to that of curare; medicinally the bark might be used as a bitter tonic. The *Alstonia constricta* yields an alkaloid, alstonine, which in many respects resembles quinine; in some insects, for example beetles and wasps, it produces at first a temporary lethargy, and if its administration is prolonged it leads to a fatal result. (It was pointed out by a subsequent speaker that this might possibly prove to be of importance in dealing with injurious pests, such as the phylloxera, which do so much damage to vines; the drug might be of value in this way even if not of great value for administration to man.) Dr. Sharp said that a tincture of *Alstonia constricta* had been found to have some slight diuretic and diaphoretic action, and he had found it useful in influenza after the most acute stage was past.

Dr. Tunnicliffe, who contributed an interesting paper on two new purgatives, prefaced his paper by some remarks on the value of this new society. It would, he hoped, bring about that partnership between laboratory research and clinical observation which is so essential if any progress is to be made in scientific therapeutics. The well known variability of action shown by drugs is a part of every medical man's clinical experience; and such variations, if accurately observed, might prove of the greatest value in suggesting the nature of impurities in drugs, or of associated active principles in drugs which are supposed to contain only one active principle; a therapeutical entity is often really a chemical duality, and it is the resolving of drugs into their active principles which is one of the most important lines of modern research.

The two new purgatives which Dr. Tunnicliffe had been investigating are purgatine and phenol-phthaleine. These are artificial synthetic drugs, and both of them have the merit of being almost invariably effective. Purgatine is given to adults in doses of 1 to 3 grammes (15 to 45 grains), and worked usually within five hours. It has, however, one great disad-

vantage, namely, that it colors the urine a bright red; this is not of course due to hematuria, although the drug is evidently excreted partly by the kidney. The ideal purgative should not "enter the system" at all; it should affect only the bowel. Rhubarb and aloes, two of the commonest vegetable purgatives, undoubtedly irritate the kidneys, sometimes increasing albuminuria which is already present, and sometimes actually causing hematuria. The other new purgative to which he referred, phenol-phthaleine, seems to act almost exclusively upon the intestine, producing tolerably certain evacuation of the bowel, and little or no effect upon the kidney, and much less lowering of blood-pressure than a saline aperient such as magnesium sulphate. Phenol-phthaleine is insoluble in water, but soluble in alcohol; the most convenient way to give it is in tablets containing 1½ to 7 grains for an adult, and about ¾ grain for an infant (the tablets for infants are crushed and given in milk). It is tasteless and does not lose its effect with prolonged use. It acts about four hours after administration, and therefore may be taken conveniently in the early morning. The stool produced is usually liquid.

I have mentioned these, the earliest communications to the new society, in some detail, in order to give some idea of the excellent promise which was given by the first meeting. It is to be hoped that this high standard may long be maintained.

Amongst the surgeons the visit of Professor Lorenz to England seems to have aroused fresh interest in the operative treatment of congenital dislocation of the hip. At a meeting of the Clinical Society, Mr. T. H. Openshaw, C.M.G., read a paper on the morbid anatomy and treatment of this condition. He said that so far as he had seen there was an acetabulum in every case, but it was shallow and small; moreover, the head of the femur, which remained normal for the first three years of life, subsequently became flattened and underwent changes which might result ultimately in its complete disappearance. He considers that the shortening of muscles should be overcome by tenotomy, and if permanent replacement is impossible owing to the shallowness of the acetabulum, this should be deepened by operation.

Mr. Noble Smith, following the method of Lorenz, advocated manipulative treatment without open operation; he would divide the operation into two stages, so as to minimize the amount of force required. The president, Mr. Howard Marsh, referred to a case which had been reported as cured by long extension, whereas according to his own observation the dislocation is in reality still unreduced.

A few days after this meeting Professor Lorenz arrived in London and operated on two cases of congenital dislocation of the hip, one bilateral and one unilateral, at the City Orthopedic Hospital, by his so-called "bloodless method." He explained the details of his treatment fully, and emphasized the necessity for thoroughly stretching the soft parts, tearing the muscles if necessary, so as to overcome all resistance to reposition of the head of the femur in the acetabulum; the leg must be kept in a position of extreme right-angled abduction for several months by fixation in plaster of Paris.

Amongst the many communications on this subject which have flooded the press both lay and medical during the last few weeks, perhaps none is more practical and valuable than a letter from Mr. Muirhead Little, one of the surgeons at the National Orthopedic Hospital, which appeared in the *British Medical Journal,* quoting actual statistics. These show that the "bloodless method" is by no means such a safe and certain cure as one might imagine from some of the published descriptions. A real cure, Mr. Little says, can only be expected in something like five per cent of the cases treated, whilst serious accidents, such as fractures of the neck of the femur, of the pubes, or of the ilium, and paralysis or gangrene of the limb, occurs in nearly six per cent. Facts such as these may well serve to temper with moderation any rash haste for operative interference.

An interesting discussion on puerperal insanity took place at the Obstetrical Society of London recently. Dr. Robert Jones read a paper based on 259 cases which had been under his own observation. This condition shows, he said, a marked tendency to recovery, which is generally complete in four or five months. He advocates home treatment in all cases if possible, special care being taken to prevent suicide or infanticide. The earliest symptoms are headache and sleepless-

ness; and it is essential to procure quiet and sleep by some means. The diet must be liberal and stimulating; iron should be given, and purgatives if necessary. The husband should be kept away, as his presence seems to aggravate the symptoms. The return of the menses is a good sign.

In the discussion which followed, the value of alcohol as a sedative in puerperal insanity was emphasized by several speakers. Dr. Herman thought that alcohol is by far the best hypnotic in the sleeplessness of this condition, and that it is less likely to do harm than some of the ordinary hypnotics, such as chloral, morphine, or sulphonal, the prolonged administration of which might lead to even more disastrous habits than alcohol. Dr. W. Griffith mentioned the danger from refusal of food, a frequent premonitory symptom of this form of insanity; he insists upon the necessity for forced feeding, even by the nasal tube if required, as a means of saving life.

There was some difference of opinion as to the need for removing these cases to asylums. The alienists were strongly in favor of asylum treatment. Dr. Amand Routh suggested a *via media* which would prevent the stigma of having been treated in an asylum—a stigma which friends of the patient are always anxious to avoid; he would have intermediate receiving houses or nursing homes in which women suffering from puerperal or other temporary forms of insanity could be treated.

Before closing this letter I must mention a change in the medico-literary world which will be regretted wherever English journals are read, namely, the retirement of Mr. Malcolm Morris from the editorship of the *Practitioner*. The vigorous and yet kindly notes on passing events of "The Month," which were a leading feature of the *Practitioner*, and the development of the "special number," which reached so high a level in the Cancer number and in those on Rheumatism and on Tuberculosis—these were triumphs which made the *Practitioner* a power in medical journalism. The first number under the new régime has already made its bow before the profession in new garb and new dimensions. If *"wohl begonnen, halb gewonnen"* be a principle of general application, the new editor, Dr. Bosanquet, may feel well satisfied with his first appearance.

## *PARIS LETTER.*

By R. H. Turner, M.D. (Paris).

It is generally thought in Italy that quinine has an abortifacient influence similar to that of ergot, ruta, and other drugs of like nature. Frederica has published in the *Clinica Obstetrica* the results of his observations amongst the fever-stricken population of the environs of Civita Vecchia. He gave quinine to forty-nine pregnant women suffering from malaria, and abortion only took place in two cases. In these two patients the fever was intense, and most probably the cause of this accident. His conclusions are that therapeutic doses of quinine are incapable of causing abortion, and that this drug can be given in such doses during pregnancy.

Two notable men in the medical world have died recently, Panas and Varnier. Panas, who was seventy-one years old, died from a chronic disease on the 5th of January. He was born in Cephalonia, in Greece, but was brought to Paris as a child, and was naturalized when he began the study of medicine. He was first of all an ordinary surgeon, but took up the study of ophthalmology after the 1870 war, when specialties began to be practiced more and more. In 1873 he published his lessons on strabismus, in 1876 on keratitis, in 1877 on diseases of the lacrimal gland, in 1878 on retinitis and inflammatory diseases of the internal membranes of the eye. A chair of ophthalmology was created for him at the Hôtel Dieu in 1879, and he occupied it until last year, when he was replaced by La Personne, of Lille. Varnier was an accoucheur, well known for his work with Pinard and Farabeuf. He was only forty-three years old when he died, from the result of a severe attack of influenza, from which he never quite recovered. His best known works are l'Obstetrique Journalien, a freely illustrated book, and Introduction to the Clinical Study and Practice of Midwifery, which he wrote with Farabeuf. He was a most precise scientist, seeking as much as possible to apply mechanics to the study of obstetrics, as well as the latest discoveries of bacteriology.

At a meeting held by the Society of

Legal Medicine on January 12, the following conclusions as to the advisability of induced abortion were submitted to the members, and will be voted on when Professor Budin and Brouardel are present: (1) When the woman's life is endangered by pregnancy, abortion becomes a legitimate performance. (2) Premature delivery is also permissible when a Cæsarian section will be the only means of delivering the woman at term. (3) When a Cæsarian section is to be carried out, the woman should be notified and her consent asked. If she refuses, the physician can induce delivery without being in any way responsible. (4) Though such conditions are now exceptional, it may be in some cases necessary to sacrifice the child to save the mother. Two questions are left unsolved: In case a woman refuses a Cæsarian section, should the physician perform embryotomy in case there is urgency? Should the physician carry out the wishes of authorized persons when the woman is unconscious?

At the St. Antoine Maternity, which is under the direction of Dr. Bar, the following treatment of ophthalmia neonatorum is carried out: As a preventive treatment, the genitalia of the mother when she is infected with vaginitis are washed with a solution of permanganate of potash or corrosive sublimate. Immediately after birth, before cutting the cord, the child's lids are carefully wiped with a dry pledget of cotton, and then one to two drops of a 1:150 solution of nitrate of silver is instilled into each eye. The child should not be given a bath, but cleansed with a mixture of equal parts of 90-per-cent alcohol, glycerin, and water.

As a curative treatment the following should be done: Wash out the eye with Kalt's apparatus, using a 1:2000 solution of permanganate of potash. This should be combined with some light cauterizations of nitrate of silver. The unaffected eye should be well protected. Isolate the child completely, and destroy all objects which may be infected. Out of 4917 children born at the Maternity from March 1, 1897, to July 1, 1901, there were sixty cases of ophthalmia, twenty-four primary and thirty-six secondary, which makes a percentage of 1.22. One-third of these cases were cured in four to five days; in nine cases the disease was more serious, the cornea being affected four times. One was completely cured, two only showed slight specks, and the fourth had almost complete opacity of the cornea.

President Loubet has begun a round of the hospitals, and last month he visited the Hôtel Dieu, where he inspected all the services. Before leaving he gave 500 francs to be used for the patients' food.

The treatment of appendicitis still continues to be discussed at the Society of Surgery. Professor Lejars, who is well known for his excellent work on Urgent Surgery, furnished his statistics dating from 1899, and including 112 patients who were operated—69 *à froid,* as the French say, with no mortality, and 43 *à chaud,* with 13 deaths. He operates upon all severe cases. Dr. Delbet said he was getting to be more and more conservative. No statistics furnished by a surgeon, with the exception of Jalaquier's, who is conservative, gave a smaller percentage than those of Leyden and Guthmann, which were established when the only treatment was medical. He only operated upon about ten per cent of the cases seen by him, operating of course upon all cases afterward. Dr. Quénu described a toxemic form of appendicitis in which the symptoms become more alarming after the operation, and the patient dies from lesions of the heart, kidneys, or liver. In such cases it would perhaps be better not to operate, but to try the medical treatment. Dr. Tuffier said he thought the change in the symptoms might be due to the escape into the circulation of the toxins formed in the appendix, and Dr. Reynier wondered if the form described by Dr. Quénu was not a species of erysipelatous appendicitis. Dr. Quénu replied that the form he had described has nothing to do with erysipelas, and that as the vessels of the appendix were tied in the early part of the operation Dr. Tuffier's remarks could not serve as an interpretation of what he had said. Professor Terrier has also given the statistics of his service during 1900, 1901, and 1902. Thirty-nine urgent operations furnished four deaths, or 10.25 per cent; seventeen operations *à chaud* were followed by death in one case only, or 5.88 per cent; sixty-one operations *à froid* gave one death, or 1.80 per cent. Thus there were 117 operations for appendicitis with six deaths, or 5.12 per cent.